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In Depth
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Mainframes get high grades Most Datapro survey respondents like their systems

By Tom Henkel
CW Staff

DELRAN, N.J. — A strong majority of more than 1,000 mainframe users polled recently said their systems have met their expectations. Furthermore, most of those users said they are sufficiently satisfied with their systems to recommend them to others.

Those are two results of an annual survey conducted by Datapro Research Corp. here (see charts on pages 56-57). The 1,079 respondents to Datapro questionnaires represent users of most major mainframes. Missing from the survey are ratings of mainframes manufactured by Control Data Corp. The reason for the omission, a Datapro spokeswoman explained, is that fewer than five CDC users responded to the questionnaire.

Almost 96% of the 1,079 users polled who answered the question (representing 22 mainframe processor classifications) said their system did what the vendor said it would do. Of that group, slightly more than 92% said they would recommend their system to another user. One reason for the disparity between users who said the system lived up to their expectations and users willing to recommend that system to others appears to be the market viability of the system in question. For example, all seven polled users of Magnuson Computer Systems, Inc.'s M80 IBM-compatible mainframes said the system lived up to their expectations. However, only four of those users were willing to recommend that system to others.

Likewise, a catchall category of outdat-
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Early product announcements: A question of ethics

By Paul Gillin
and David Olmos
CW Staff



On April 19, 1983, Cullinet Software, Inc. announced what its advertisements for months had called "the dawn of the software age." At a slick New York press conference, the company unveiled a line of products intended to address two of the hottest new areas in software: relational data base management systems and microcomputer-to-mainframe links.

There was one hitch: The new products were not set to enter beta testing until nine months after the announce-

ment, and general release was not planned until six months after that. The announcement sent a quiver through the software industry.

Competitors hastened to criticize the company for what they said was a backdoor effort to lock up a market before a product was even fully coded. To this day, the early Cullinet announcement is a frequent topic of industry debate.

Cullinet, on the other hand, has flatly maintained that the announcement was an important expression of a new corporate direction, one that also served to draw attention to the software industry as a whole. And it asserts that it will meet its announced deadline of commercial shipment this month.

The April 19, 1983, press conference is the most visible, but by no means the only, example of a resurgence of early announcements that has occurred in the large systems software industry in the last two years. What underlies the verbal assaults that vendors have been heaping on each other is a larger ethical question. By announcing new products many months in advance, are vendors giving the market an early glimpse of exciting new technologies or merely playing a shell game with unwitting customers?

"It's important when you have a large customer base that they know your plans so they can plan accordingly," Cullinet Chairman John Cullinane said. "Cullinet has a long and demonstrable track record of consistently meeting delivery dates."

Shaku Atre, president of Atre International Consultants, Inc. in Rye, N.Y., said, however, "The people who are really suffering [from early announcements in general] are the clients."

Early announcements are not new in the software industry. IBM has been making them for years. In fact, two months after the Cullinet press conference, IBM announced its DB 2, a relation-

See ANNOUNCE page 14

DP/MIS managers tell DPMA survey they are unappreciated, underpaid

By John Gallant
CW Staff

PARK RIDGE, Ill. — Despite what they see as the vital nature of their work, DP managers responding to a recent Data Processing Management Association survey complained that they simply do not get enough respect from top management.

The salary and job satisfaction survey findings released by DPMA indicated that a majority of the DP/MIS professionals polled feel they are not adequately compensated "in relation to their corporate stature." In addition, the DPMA members responding said they wanted more respect from their superiors and more appreciation for their unique job functions.

According to Austin Weber, editor of

the DPMA newsletter "Comp-U-Fax," the survey was conducted in May, and findings were based on 200 responses from DPMA members. The survey results, published in the July issue of "Comp-U-Fax," show that DP/MIS managers earn an average salary of \$40,598 annually. The respondents had an average of more than 17 years' DP management experience, and they received an average 7.7% salary increase last year.

However, nearly 60% of the DPMA members responding said they do not feel they are "sufficiently paid when compared with other corporate executives with similar levels of responsibility." According to Weber, DP/MIS professionals

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TOP OF THE NEWS

A sweet deal. A federal judge ordered a software firm to turn over sensitive source code data to M&M/Mars in a potentially significant decision that could affect other firms seeking to protect proprietary information. **Page 2.**

A micro manager is not an overseer of little matters. Rather, he is responsible for a myriad of tasks in a rapidly evolving corporate microcomputer environment. Micro managers outlined those tasks in recent interviews with *Computerworld*. **Page 4.**

Intending the machine to be part of an upgrade path for its 16-bit users, Nixdorf Computer Corp. rolled out a 32-bit supermini based on microcircuitry from Intel Corp. and National Semiconductor Corp. **Page 6.**

Et tu, NAS? National Advanced Systems Corp. held its own product fireworks last week, rolling out an entry-

level supercomputer it claims can out-crunch anything else in its price range. **Page 8.**

A license to steal? That's what two MIT researchers have suggested regarding computerized data searches used to uncover welfare and insurance fraud. The high error rate of such searches may violate civil rights, they contend. **Page 10.**

Don't be too strict. That's the warning issued to government DPers about the proliferation of microcomputing. Attendees at the recent Government Computer Expo '84 Conference also heard timely tips on information centers. **Pages 12-13.**

Walk softly. Wang Laboratories, Inc. has been quietly testing the waters of the communications carrier business with a wholly owned communications subsidiary established a year ago. **Page 125.**

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NEWSPAPER

NEWS

Judge orders software firm to hand over source code

By Bryan Wilkins
CW Washington Bureau

NEW HAVEN, Conn. — A federal judge here has ordered a software firm to turn over the source code of one of its commercial products for examination by a corporate user who charged the product failed to work.

The action by U.S. District Court Judge Ellen Bree Burns was in response to a lawsuit filed against Creative Output, Inc. (COI) of Milford, Conn., by M&M/Mars, a division of Mars, Inc., the multibillion dollar candy manufacturer. Patent attorneys believe the decision is potentially significant because software firms are fiercely protective of their source code and because both U.S. courts and patent laws have moved to recognize the proprietary nature of software as property.

Burns recently ruled that M&M/Mars attorneys were entitled to look at the source code of Optimised Production Technology (OPT), a software program marketed by COI, to determine whether COI misrepresented the abilities of the program when the firm originally sold M&M/Mars officials on its use.

Burns' ruling came after she issued a judgment against COI and Creative Output Ltd. (COL), an Israeli

computer software firm affiliated with COI, in another M&M/Mars lawsuit against the firm over a software program that was not delivered [CW, Jan. 30].

In that judgment, Burns ruled that there was "probable cause" that a contract between M&M/Mars and COI and COL had been breached and allowed the candy maker to "attach and garnish" the assets of the software firms in the amount of \$370,198 — the amount M&M/Mars paid to COI and COL for the program called Planned Order System.

The court found that an operational Planned Order System was not delivered by COI and COL to M&M/Mars and that "more than adequate opportunity" was given the software company to "cure the defects" in the software, including a cash incentive to complete the job as soon as possible.

COI and COL argued that it had made a "substantial performance" toward completing the Planned Order System contract and that a two-year contract term existed instead of a three-month term, as claimed by M&M/Mars.

In March 1983, COL filed suit against M&M/Mars in Israel, charging that an oral promise for a two-

year Planned Order System contract was broken and that there was no obligation to deliver functioning software. It claims \$17 million in damages. The Israeli court refused to dismiss the case, which is still pending.

Burns wrote, "Although a disagreement apparently remains as to whether this was a contract for goods or one for services, it is clear that what [M&M/Mars] was ultimately bargaining for was an operational Planned Order System software program. Such software was never delivered."

Burns' judgment against COI and COL only covered the actual payments M&M/Mars paid the software firms for the work. The judge rejected \$600,000 in other claims covering the cost for the acquisition of a Prime Computer, Inc. computer to run the Planned Order System program, personnel expenses incurred in-house and other out-of-pocket expenses connected with the lawsuit.

Meanwhile, the action by Burns to order COI to make the source code for the OPT program available to M&M/Mars attorneys increases the likelihood that the \$300,000 damage claim in that suit will be settled. Negotiations between the two companies for

an out-of-court settlement have been held, but with no success.

M&M/Mars claimed in that case that COI and COL "misrepresented" the abilities of the OPT product in the continuous flow processing of nougat, the chewy interior of Mars candy bars.

While OPT required specific tailoring to the user's needs, M&M/Mars officials said that, in fact, OPT never could have been fitted to their workplace, and COI and COL oversold the product.

M&M/Mars claimed that it was impossible to tailor OPT and that COI and COL should have known this. M&M/Mars sought the source code of OPT to prove its claim.

M&M/Mars entered into a contract for use of the OPT program in June 1981. It entered into a contract for use of the Planned Order System in May 1982.

CORRECTION

"Merrill Lynch breaks ground with prototyping effort" [CW, June 25] gave an incorrect location for Eureka Software Corp. The company is located at Suite 550, 3857 Birch St., Newport Beach, Calif. 92660.

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NEWS

Micro managers must wear many hats

By Edward Warner
CW Staff

NEW YORK — What do microcomputer managers do? What lessons have they learned in their work? And what advice can they share? A group of microcomputer managers interviewed here recently answered those questions with surprisingly similar descriptions of their jobs — and with widely varying advice.

For the most part, the microcomputer managers interviewed by *Computerworld* are responsible for providing software support, usually through purchase recommendations, to their corporations' microcomputer users. In many cases, that task is supplemented by responsibility for training, installation, testing of equipment and, in one case, publishing an in-house newsletter for users.

Gene Maimin, project manager for microcomputer support at Columbia Pictures Industries, Inc., installs microcomputers and instructs users in their operation. Ion Amariuta, however, is specifically in charge of software evaluation for the roughly 400 to 500 microcomputers in use nationally by the accounting firm Coopers & Lybrand. Stephen Machlis, a microcomputer consultant with Goldman Sachs & Co., is in charge of examining developments in microcomputer technology and of producing an internal newsletter discussing those changes. Machlis said the Goldman Sachs information sciences department, where he works, also provides training and equipment recommendations to the firm's microcomputer users.

Most microcomputer managers interviewed, though, described their duties in a way similar to that outlined by Alan Gross, a technical planning specialist for Smith Barney Harris Upham Co. Gross is part of a three-member team responsible for microcomputer training, configuration, systems analysis and the setting of policies regarding which micros and software will become the investment banking firm's standards.

All of the microcomputer managers interviewed are members of the Microcomputer Managers Association (MMA), a national association, and all had advice to help their col-

leagues cope with their responsibilities. The MMA is located at 35 Harvey St., Cambridge, Mass. 02140.

Gross, president of MMA's New York chapter, said microcomputer managers "need to appreciate the end users' environment. We need to have a firm understanding of what the users' jobs are — how they perceive computers, how they work with microcomputers." Gross said he

"The best advice that a micro manager can give to his client would be 'take your administrative assistant, take your secretary, take your stockroom boy who is grumbling and moaning that he wants some advancement — make them your programmers.'"

—Kenneth Edelstein

also advocates a "broad, long-term view [to determine] where micros fit into the corporate information processing philosophy."

Maimin, meanwhile, warned that users can be influenced by the plethora of microcomputer-related advertising to put "pressure on the micro manager [by saying] 'Let's try this package. Let's try this printer.'" Maimin said he cannot dictate to users which products to buy, but only certain software products are supported in-house by his firm.

He said, "The approach should be, 'If you, Mr. User, buy it on your own, you support it on your own, and don't expect us to solve any problems it creates in terms of mixing your environment.'"

In terms of standards, Maimin said, the administration of Columbia Pictures' New York office has been "farsighted enough and smart enough to standardize on the [IBM Personal Computer]." Fifty-five IBM Personal Computers and Personal Computer XT's are in use by that office, he noted, as is a limited range of software and peripherals. "I know what I've got out there," he added. "We don't buy the latest printer just because it works."

Kenneth Edelstein, microcomputer support manager for Merrill Lynch

Pierce Fenner & Smith, Inc., warned that microcomputer installations spread over extensive branch office locations typically get out of touch with the support provided by corporate headquarters.

"The satellite locations typically don't have programmers or any support people," he explained, so "the best advice that a micro manager can give to his client would be 'take your administrative assistant, take your secretary, take your stockroom boy who is grumbling and moaning that he wants some advancement — make them your programmers.' Technology is simple enough that any person who can do good office [work] can learn a [GMS Systems, Inc.] Power Base or a Lotus Development Corp. 1-2-3 or an [Ash-ton-Tate] Dbase II. These things are not meant for [only] the computer aristocracy."

"Anyone who's capable of using an [IBM Selectric] typewriter is capable of using [Multimate Corp.] Multimate. True, you may work yourself out of a good secretary," but it will be worth it, Edelstein said.

Several of the microcomputer managers also had unique projects under way at their firms to improve microcomputer training or support.

Candace Pamerleau, senior consultant for microcomputer support at Metropolitan Life Insurance Co., noted that her department has presented an overview of its microcomputer applications in the form of a skit for potential users. The half-hour skit was called "A Day in the Life of a Modern Manager," and Pamerleau said those managers who viewed it were, "in a very nonthreatening environment, able to see the use of our products."

Merrill Lynch's Edelstein said he has started an electronic bulletin board for the nearly 5,000 microcomputers worldwide supported by the firm. He has placed public-domain software on the bulletin board, which he calls Microshare. Users can download that software to their individual machines.

Included on the bulletin board, he added, are about a half-dozen games to tempt first-time users into learning how to upload and download to the bulletin board.

Micro managers' common thread: being the first

NEW YORK — If a group of microcomputer managers interviewed here recently had anything in common, it was this: They often were the first in their firms to do the work they do, and several came to their jobs by way of an interest in home computing. Beyond those similarities, though, there were many differences.

Candace Pamerleau came to her job as the manager for microcomputer support at Metropolitan Life Insurance Co.'s information center, with an education in biology and psychology plus experience as a roving troubleshooter for the insurance firm.

Alan Gross, president of the Microcomputer Managers Association's New York chapter, has a degree in chemistry and is now part of a three-man micro support team at Smith Barney Harris Upham Co., an investment banking firm.

Kenneth Edelstein, manager of microcomputer support in the Merrill Lynch Pierce Fenner & Smith, Inc. information services department, brought a more traditional educational background to his DP position: a two-year degree in data processing coupled with a bachelor's degree in a combined major of accounting and industrial psychology.

Both Edelstein and Pamerleau became interested in microcomputing as a result of their home computers, a Cybertek SYM-1 and a Radio Shack TRS-80 Model III, respectively. So too did micro manager Gene Maimin, who received a Commodore Business Machines, Inc. VIC-20 as a birthday present one year and went on to tout its potential to his employer, Columbia Pictures Industries, Inc.'s New York office.

At the time, Maimin was a senior methods analyst, having moved into that spot from a position in finance. When Columbia Pictures decided to create a position for a manager of microcomputer support, Maimin applied.

'Framework' shipment postponed

CULVER CITY, Calif. — Ashton-Tate last week announced it has delayed shipments of its Framework integrated productivity package, originally scheduled for July 2, until later this month. The company attributed the delay to the addition of telecommunications capabilities.

The telecommunications features reportedly will enable users to send and receive information from outside data sources, bulletin boards and individual users. The new features include single-keystroke access and logon to an information system and the ability to transfer binary and text data files, Ashton-Tate said. Framework reportedly offers 7-bit

and binary transfer protocol support.

Originally, Framework was designed to work within 256K bytes of random-access memory (RAM). With the added telecommunications capabilities, Ashton-Tate President David Cole recommended, the user should have 384K bytes of RAM to operate the package.

Framework costs \$695. The integrated package now includes word processing, spreadsheet, forms processing, data base management, graphics, idea processing and communications modules.

Ashton-Tate is located at 10150 W. Jefferson Blvd., Culver City, Calif. 90230.

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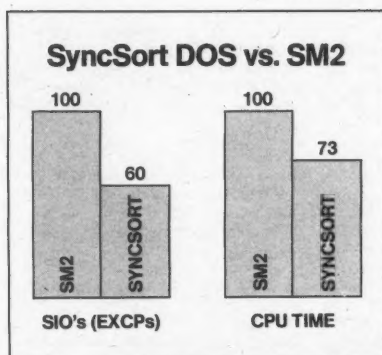
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SyncSort DOS

One smart cookie deserves another.

NEWS

Nixdorf unveils 32-bit supermini, expands 16-bit lineup

By John Desmond
CW Staff

WALTHAM, Mass. — Nixdorf Computer Corp. last week announced a 32-bit superminicomputer designed as an upgrade path for users of the firm's 16-bit Series 600 minicomputers.

In addition, the firm unveiled several 16-bit minicomputers, including an additional model for the firm's 8870 line and a five-model series of distributed processing systems, called the 8850 line.

Highlights of the announcements included:

- The 8855 Model 10, a 32-bit supermini, based on the National Semiconductor Corp. 16032 microprocessor. The unit is said to use an Intel Corp. 80186 coprocessor. The Model 10 is available to Series 600 users as a field upgrade, called the 600 Model 75. Both the Model 10 and the 600 Model 75 feature up to 2M bytes of main memory and up to 132M bytes of disk storage. Both models can support up to 528M bytes of on-line storage and can provide support for up to 64 local or remote terminals. Both the 8855 and the 600 Model 75 are said to be available for fourth-quarter delivery.

- The 8870 Model 15, a low-end addition to the 8870 line. It features main memory of up to 512K bytes, storage capacity ranging from 16M to 64M bytes and floppy disk storage available in either 256K or 512K bytes. The Model 15 offers 16M- and 32M-byte disk drive capacity, with disks that back up to a streaming-mode cassette unit.

The Model 15 is said to support up to eight display workstations and up to four printers and includes a 2,400 bit/sec internal modem for remote support. The company said the Model 15 will be available for delivery within 90 days. The company

also announced it will no longer market the former low-end Models 3, 5 and 10.

- A five-model series of 16-bit minicomputers designed for distributed processing applications, called the 8850 series. Models 25, 35, 45 and 55 are functionally identical to the firm's older 600 series minis, but are packaged in smaller cabinets. A high-end 8850 Model 65 was designed for multi-tasking applications. The systems are reportedly field-upgradable to the newly announced 32-bit 8855 Model 10.

- An enhanced version of Nixdorf's Dpex operating system, called Dpex V, which can be used on the 600 series as well as the newly announced 8850 processors. The enhancements are said to include support for IBM's Systems Network Architecture/Synchronous Data Link Control as well as IBM batch and interactive communications protocols.

- An enhanced version of the firm's Comet business data processing software, designed for decentralized business applications. Comet Top runs on the 8870 family of CPUs and offers real-time processing, the company said. A number of application modules are available, including financial accounting, word processing, payroll and graphics.

- The 8810 Model 60 terminal unit, designed for applications requiring a 132-col. display, and the 8810 Model 65 System Professional Computer, said to allow personal computing functions to integrate with departmental system applications when connected to either the 8860 models or the 600 series host processors. The Model 65 runs on Digital Research, Inc.'s Concurrent DOS operating system,

has a PC-DOS filter for running IBM applications and can also run Digital's CP/M 86 applications, the company said. The Model 65 will also support the Basic, Cobol, C, Pascal, PL/I and Fortran application languages, the company said.

Product prices

The 8855 Model 10 features a four-tier cabinet that houses the main CPU, terminal and communications I/O processors, up to 2M bytes of real memory, an autoloader magnetic tape transport and controller, up to 132M bytes of disk storage, a power supply and a battery backup unit to maintain real memory in the event of a power outage.

An 8855 Model 10 system, including 512K bytes of memory, a 132M-byte Winchester disk drive, autoloader tape, eight terminals and a 300 line/min system printer, is priced at \$97,500, the vendor said. The average upgrade price to the Model 75 ranges between \$10,000 and \$12,000, the vendor said.

A number of printers are available for the 8870 Model 15, the same as those available on the larger models of the 8870 system family, including 100 char./sec and 150 char./sec compact printers and a 210 char./sec ink-jet printer.

The basic 8870 Model 15 system, including 256K bytes of memory, 16M bytes of fixed disk storage, a streaming-mode cassette drive and a 2,400 bit/sec internal modem for remote support, is priced at \$13,500, the company said.

Prices for basic configurations of the 8850 line range from \$27,500 to \$119,400.

Nixdorf is located at 300 Third Ave., Waltham, Mass. 02154.

Nixdorf's 16-bit minis, Dpex V offer enhanced distributed DP

By Tom Henkel
CW Staff

WALTHAM, Mass. — Nixdorf Computer Corp.'s newly announced 8850 family of 16-bit minicomputers replaces the firm's older 600 series minicomputers and is said to offer enhanced capabilities for distributed processing.

Also announced was an enhanced version of the firm's Dpex operating system, called Dpex V, which is said to incorporate enhancements to offer greater communications capabilities with IBM systems.

Unveiled last week were five models of the 8850 series. Four low-end models, the 25, 35, 45 and 55, are said to be functionally equivalent to the 600 series minicomputers with the same model designation. The 8850 systems have been packaged in a smaller cabinet, which houses: the CPU, peripheral and interface controllers; an autoloader magnetic tape transport; up to 528M bytes of disk storage; power supply and battery backup. The 8850 units can support 128K bytes of main memory, the vendor said.

The high-end 8850 Model 65 is said to incorporate a higher performance CPU than the other models, thus making it suitable for use in multitasking applications. The performance capabilities of the Model 65 are also available to 600 series users in a configuration called the 600 Model 65, the vendor said.

The 8850 Model 25 is suited for small offices or for distributed processing applications. The unit can support up to nine workstations or tasks and up to 8M bytes of fixed

media disk storage. It also supports dual-sided diskette drives. The Model 25, with 8M bytes of disk storage, dual diskette drive and four workstations, costs \$27,500.

The 8850 Model 35 also offers support for nine workstations, but can accommodate up to 66M bytes of disk storage. The unit can also use a tape drive. The Model 35, with a tape drive, 66M bytes of disk storage, six workstations and a 300 line/min printer, costs \$65,400.

The Model 45 can support up to 16 terminals, a tape drive and up to 132M bytes of disk storage. The Model 45, including tape drive, 66M bytes of disk storage, 12 workstations and a 300 line/min printer, costs \$87,500.

The Model 55 can accommodate up to 528M bytes of on-line storage for operations requiring large amounts of locally stored data. It can also support up to 32 workstations. The Model 55, with a tape drive, 132M bytes of disk storage, 20 workstations and a 300 line/min printer, costs \$119,400.

An 8850 Model 65, which offers the same peripheral capabilities as the Model 55, with 128K bytes of main memory, 132M bytes of Winchester disk storage, tape drive, eight terminals and a 300 line/min printer, costs \$95,400.

All systems will be available in the third quarter, the vendor said.

The 8850 models, as well as the older 600 series systems, can use an enhanced version of Dpex V, which costs \$8,500 and is available now.

Nixdorf is located at 300 Third Ave., Waltham, Mass. 02154.

Workstation, mini software, terminal round out offerings

By Tom Henkel
CW Staff

WALTHAM, Mass. — In addition to announcing several supermini and minicomputer systems, Nixdorf Computer Corp. last week announced an intelligent workstation and a terminal. The firm also unveiled an enhanced software package for its 8870 minicomputer line.

The terminal is the 8810 Model 60. It was designed for applications that require a 132-col. display. The unit can be attached to Nixdorf's 8860 family of networking systems. The Model 60 terminal costs \$3,300.

The intelligent workstation is the 8810 Model 65 System Professional Computer. Using an Intel Corp. 80186 microprocessor, the Model 65 allows simultaneous integration of microcomputer functions with departmental system applications when connected as a native terminal to a Nixdorf host processor. The Model 65 can be attached to Nixdorf's 8860 family as well as to the firm's 600 series minicomputers. The unit can also be attached to the newly announced 8850 family and 8855 Model 10, the vendor said.

The Model 65 can emulate a Nixdorf terminal. It can also use Digital Research, Inc.'s Concurrent DOS operating system. It can perform up to four concurrent sessions, which can optionally be displayed in multiple windows.

The available concurrent sessions include:

- Nixdorf terminal emulation.
- IBM Personal Computer applications through use of a filter to IBM's PC-DOS operating system.

- Digital Research CP/M 86 applications.

- Multiple communications protocols.

The 8810 Model 65 uses an enhanced version of Concurrent DOS that supports the unit's direct-memory access architecture. The Model 65 comes with a detached disk unit capable of supporting two disk drives. Nixdorf said it will offer two types of 5¼-in. disk drives: a 48 track/in., 512K-byte disk drive compatible with IBM's Personal Computer; and a 96 track/in., 1M-byte drive.

The 8810 Model 65, with 512K bytes of memory, one floppy disk drive and a 12-in. monitor, costs \$4,960. An additional floppy disk drive costs \$400, and a 10M-byte fixed disk drive costs \$1,800.

Nixdorf also announced an enhanced version of its Comet business software package, Comet Top. It runs on Nixdorf's 8870 minicomputers and includes 10 modules: financial accounting, order processing and invoicing, purchase order processing, cost accounting, word processing, fixed asset accounting, inventory control, production control, payroll and graphics.

The Comet Top package can be purchased, including a one-time license fee, for \$1,500 to \$9,500, depending on modules selected. Monthly support is optional. Individual modules can be leased for between \$35/mo and \$290/mo. The lease price includes installation, training and monthly maintenance.

Nixdorf is located at 300 Third Ave., Waltham, Mass. 02154.

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NEWS

NAS enters vector processing arena with supercomputer

By Jeffrey Beeler
CW West Coast Bureau

MOUNTAIN VIEW, Calif. — National Advanced Systems, Inc. (NAS) last week entered the vector processing arena with the introduction of what it called an "entry-level supercomputer" said to fill the performance gap between general-purpose scalar mainframes and full-fledged number crunchers.

Reputed to outperform IBM's 3080 series uniprocessors by 14-fold for vector processing, the AS/9100 supercomputer fits in the same enclosure as NAS' business-oriented AS/9000 mainframes, according to the company's Vice-President and General Manager Jerry Ungerman.

Unlike NAS' other families of IBM-compatible mainframes, the AS/9100 comes with no internal storage or channels of its own. Instead, the low-end supercomputer has direct access to the same system resources as the AS/9000 processors with which it is integrated, according to the company's marketing director, Bob Ludwig.

Sharing allows upgrading

This sharing of main memory, channels and enclosures allows all five members of the AS/9000 line to be upgraded in the field to include both scalar and vector processing capabilities. The AS/9100 can be inserted into the AS/9000's three uniprocessor models for \$300,000 and into the mainframe family's two mul-

tiprocessor systems for \$600,000, Ungerman said.

NAS' decision to integrate a vector machine with its existing scalar CPUs "gives the company a jump" on other mainframe suppliers and is a "pretty logical move," according to International Data Corp. market analyst Dave Moschella.

"Twenty to 40% of the code that's running in a lot of shops is written in Fortran," Moschella said. "A lot of that code can be adapted to run on a vector-type machine to provide a much higher level of performance."

Both target same user

Intended for computing-intensive applications such as aerospace development, automotive manufacturing and semiconductor design, the AS/9100 supercomputer is aimed at exactly the same class of users as the AS/9000 series, Ungerman said.

The AS/9100 for the first time provides supercomputer-class power to users who need vector processing capabilities, but who are unable to afford full-size Cray Research, Inc. or Control Data Corp. (CDC) number-crunching machines, Ungerman said.

In the past, such users have had no alternative but to do their vector processing applications either on general-purpose scalar mainframes, such as the AS/9000 machines, or on time-shared supercomputers, Ludwig said.

Both alternatives, however, have distinct drawbacks. Time-shared su-

percomputers, for example, offer inadequate data security for many vector processing applications, which are often part of sensitive commercial research and development projects, Ludwig said.

Conventional scalar CPUs, by contrast, are ill suited for vector processing and thus usually operate too slowly to do supercomputer-class, number-crunching tasks efficiently.

Capable of executing 28 million floating point operations per second (flops), the AS/9100 processes vector data nine times faster than the AS/9000, NAS' former top-of-the-line mainframe family, Ludwig said.

The AS/9100's performance level makes the NAS vector machine three times more powerful than its nearest equivalent — IBM's Model 3838 array processor, which operates at roughly 8M flops, Ludwig said. A

full-fledged Cray or CDC supercomputer, by contrast, reportedly executes at about 200M flops.

Bundled into the AS/9100's systems package is a Fortran precompiler that allows existing AS/9000 code to be adapted to run on a vector processing machine without requiring any programmer intervention, Ludwig said. Pacific-Sierra Research Corp.'s Vector and Array Syntax Translator (Vast) analyzes Fortran programs, identifies operations that can be vectored and converts them accordingly.

When bought together as part of the same package, Vast, the AS/9100 and an AS/9000 mainframe range in cost from \$2.1 million to \$5 million. Shipments of the entry-level supercomputer begin on Aug. 15 from NAS at 800 E. Middlefield Road, Mountain View, Calif. 94042.

Report predicts banks to triple computer expenditures by 1989

MOUNTAIN VIEW, Calif. — Banks and other financial institutions will almost triple their expenditures for computer equipment, software and services during the next five years, according to a report from Input, Inc.

Banks, savings and loan companies, security and commodity firms and other financial firms will spend \$4 billion for industry-specific information services in 1984 and \$11.2 billion for the same purpose in 1989, according to the research firm located here. The growth in spending is tied to the financial industry's shift from local to regional and national orientation, the researchers said.

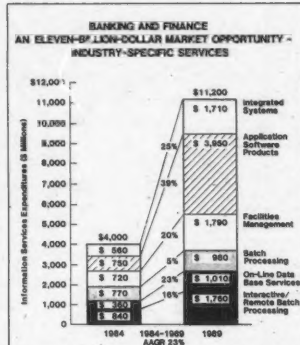
Commercial banks will continue to provide the most attractive market for vendors, increasing their \$2.5 billion DP acquisition budgets by an average of 24% to \$7.4 billion in 1989, the report predicted. The financial industry as a whole will increase expenditures by an average of 23%, the report said.

The report, "Market Update: Banking and Finance Information Services 1984-1989," was based on data gathered through 85 interviews with financial institutions and from reports from the Federal Reserve Board, Federal Deposit Insurance Corp., savings and loan companies, credit unions and earlier Input research.

Key growth areas

Key areas of growth in financial information services expenditures will be financial electronic networks and application software, according to the report.

"As financial electronic networks spread to the consumer marketplace, on-line and interactive products and services will become ever more important. Interactive [data-base-management-system-oriented] processing will be used for such main-line applications as retail banking, [savings and loan] and mortgage servicing. Expenditures for on-line data base services will nearly triple during the next five years, as firms and consumers apply historical and forecast fi-



nancial information to an ever-widening array of applications," the report said.

Input found that financial industry application software products will become a nearly \$4 billion market by 1989 as microcomputer applications that now represent 20% of the application software products experience an annual growth rate of 50%.

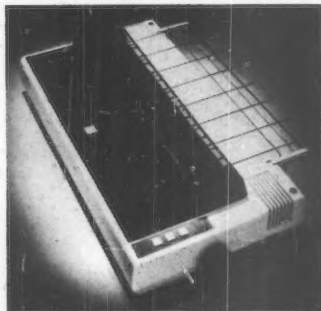
The researchers said that batch processing will remain significant, being used on "stable applications" such as payroll, credit card processing, taxes and securities processing.

They added that medium to large banks are "excellent targets" for vendors offering facilities management services.

In addressing vendors, the report urged that they select market niches; target multibank and other financial institution holding companies; broaden product lines by acquisitions and joint ventures and by designing offerings for multiple sectors; tie data base services to application solutions; expand network services to consumer markets; use micro-based software to extend applications; and shift main-line applications to on-line.

The report costs \$1,400, according to Input, which is located at 1943 Landings Drive, Mountain View, Calif. 94043.

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NEWS

Survey: DP job outlook good for third-quarter 1984

CLEVELAND — Although the third-quarter job outlook for data processing professionals remains good, employers plan nearly 10% fewer hirings than during the past quarter, a recent national survey found.

In a survey of 300 company executives with hiring responsibilities, nearly 40% of the respondents said they plan to increase their DP staffs during the current quarter, while 52% said they intend to maintain present staff sizes. Slightly more than 7% of the respondents plan to trim their staffs, according to the survey by CompuSearch, a division of Management Recruiters International, Inc.

The projections on new hiring indicate a slowdown from results of CompuSearch's second-quarter survey, which found that 49.5% of the companies planned to increase their DP staffs.

The study's methodology involved telephone interviews with 300 executives responsible for hiring DP professionals at a select group of companies, located across the U.S., ranging in size from less than 100 employees to more than 1,000.

Alan Schonberg, president of Management Recruiters, said the forecast slowdown in new hiring pertains not only to DP, but seems to reflect a general trend in other job sectors as well. "This reflects a healthy leveling off

and stabilized approach to staff level that had been expanding at an almost frantic pace," he said.

The greatest growth in new hiring will be in New England and the Mountain states, the survey found, although projections for New England are inconclusive because of insufficient data for that region. Nearly 59% of the companies in the Mountain States plan to expand their DP staffs.

The survey indicated that the majority of staff reductions are planned by companies with less than 500 employees. Companies with less than 100 employees were the most likely to project staff reductions (13.8%). Firms with between 500 and 1,000

employees were the least likely to forecast layoffs (1.3%).

The electrical and electronics industry topped the list of companies planning to bolster their DP staffs. Nearly 56% of the executives interviewed in that industry said they plan to add DP employees this quarter.

Other industries with favorable hiring projections included finance, insurance and real estate (50%); textiles (45.5%); transportation, communications and public utilities (42.1%); and fabricated metals (40.9%).

Copies of the survey results are available free of charge from CompuSearch, 1015 Euclid Ave., Cleveland, Ohio 44115.

SALARY from page 1

see their corporate peers as executives in personnel, marketing, finance and other management-level positions — all of whom were seen as more highly rewarded than their DP colleagues.

'Visibility quite poor'

The majority of DPMA members (62%) said that DP's "visibility" within the corporate structure is "still quite poor," and DP is often not considered a valuable organizational entity. Respondents claimed that DP continues to be viewed as a support function and not as an area of strategic responsibility.

"DP managers clearly feel that for what they contribute to corporate goals, they remain very low on the totem pole," Weber said.

Not surprisingly, more than 60% of the DP professionals surveyed said they wanted more visibility within the organization and more respect from top management.

"I think the most important topic raised in the survey is the issue of corporate visibility. DP is still seen as a back-room type of operation without a lot of authority. There is a clear need for top management to interact more with the DP manager, to realize how DP can be utilized to attack strategic corporate problems. Often, the DP professional is seen simply as a supplier of information and is not involved in formulating strategy," Weber said.

Challenge most important

When asked what factors motivate them in their work, 48% of the DP managers responding said that challenge was the most important motivation.

Weber said the challenges referred to by DPMA members were working under deadlines, providing accurate and timely information and increasing productivity. Other motivational factors listed included career enhancement (22%), salary (18%) and power/prestige (12%).

According to the survey, the average DP professional works 47 hours a week. When asked which type of overtime compensation they preferred, 56% of the respondents said they would choose a cash bonus, and 44% said they would prefer to receive time off.

Survey results can be obtained from DPMA, International Headquarters, 505 Busse Highway, Park Ridge, Ill. 60068.

System Accounting in VM

Who Has Their Hands in Your Information Center?

Just six months ago, you told your executive committee that the proposed computer system for your Information Center would meet the corporation's needs for two years. Now it seems the system will be saturated in the next two months. Your chief executive wants to know why.

Your staff is able to identify individual users, but cannot track each user's resource consumption. You cannot identify where the overrun is.

System accounting in a VM interactive environment inherently demands a different approach than you may expect. VM just doesn't provide the raw accounting data offered by other systems. Still, you need to account for system and resource usage in your VM Information Center.

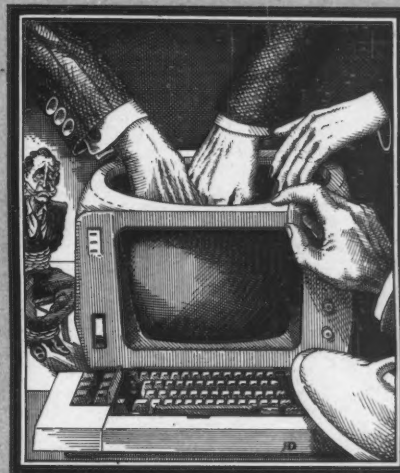
PERSPECTIVE

Many MIS and DP executives began their careers in the MVS environment, and consequently view system software product evaluations from an MVS perspective. A VM based Information Center though, simply does not fit into the MVS world. That is not to say that VM is inherently better; it's just very different.

HISTORY

MVS has been a strategic product for IBM since at least the early 1970s. This strategic "label" caused IBM to devote substantial development resources, over a long period, to enhancing MVS and all of its component parts. The success of this long term effort shows today. MVS is a robust, full featured, reliable, and stable batch operating environment. But as an interactive support environment, it is seriously deficient in terms of productivity and end-user friendliness.

This deficiency created the need for VM. The explosive growth in the number of VM sites is largely due to VM's clear superiority over MVS as an interactive decision support environment. As the Information Center and Development Center concepts grew in popularity, IBM labeled VM as a "highly strategic" product and began to devote extensive development resources to enhancing the product. IBM's VM



development team is moving aggressively to close the enhancement gap between MVS and VM.

SYSTEM ACCOUNTING

A good example of the difference in relative sophistication of features between MVS and VM internals is in system accounting.

MVS allows you to collect over 200 different types of records from the Systems Management Facility (SMF) and the Resource Management Facility (RMF). Independent software vendors have created products that allow this SMF and RMF data to be summarized and reported in a myriad of useful ways. The key to this success is that MVS itself offers native real-time collection and management of these records in the SYSLMAN data sets.

VM in contrast produces only six basic accounting records. Many more are required before system accounting in VM will reach the level of sophistication enjoyed by MVS. No software vendor can build a VM accounting product as complete and strong as the existing MVS products because the raw data just isn't available in VM. Many enhancements to MVS accounting came as a result of pressure from

Similar problems exist in project accounting. You must be able to track expenditures to budget and enforce budget controls by project.

To be accurate in a VM environment, this data must be collected real-time. Batch accounting is sufficient for a batch environment, but for pure interactive work, only real-time accounting is timely enough.

Of course you also require the ability to do the traditional system accounting functions of invoicing, management reporting, auditing, and security enforcement.

WHAT IS YOUR SOLUTION?

The senior developers at VM Software Inc. have the experience to force an accounting system to meet these needs through extensive modifications to VM internals but this would be a serious mistake. IBM is moving so aggressively to enhance VM that there is no way to ensure that internal modifications to VM made by an independent software vendor today will operate on the next VM release. This is an assurance you must have before you acquire any software package. An effective VM accounting system must work within the existing framework of the VM environment, yet allow for future VM growth.

We at VM Software Inc. have developed six products that work together to help you run your VM Information Center more efficiently. VMACCOUNT meets the resource accounting needs discussed above. Perhaps more importantly, VMACCOUNT is specifically designed to grow in sophistication as IBM enhances VM to collect and report more detailed data on system usage. VMSI, as the leading vendor of VM system software products, understands the intricacies of VM and the needs of VM Information Centers. VMACCOUNT is designed to meet these needs, now and in the future.

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IBM user groups. These groups are placing similar pressure now on IBM to enhance VM accounting. VM will evolve substantially, but you need resource accounting now.

YOUR ACCOUNTING NEEDS

What is important to the MIS or DP manager in an interactive decision support environment? The accounting demands of MVS and VM system accounting are externally similar but with significant internal differences. The needs are the same, but the implementations are different.

Let's look at your needs from an overall management perspective. First, if you are running an Information Center under VM, you don't have the control over resource consumption that you would under MVS, nor do you have the predictability of the timing of resource demand. Other departments can consume huge portions of your resources without notice, and worse, without accountability.

Next, you may be forced to fund large software purchases for another department with no way to recoup the cost or even determine whether the acquired software product is being used.

NEWS

Data searches seen liable to error, civil rights breaches

By John Desmond
CW Staff

CAMBRIDGE, Mass. — Two MIT researchers have suggested that computerized data searches that uncover welfare and insurance fraud and identify arsonists and skyjackers carry a high risk of error and, in some cases, may be civil rights violations.

Professor Gary T. Marx and Dr. Nancy Reichman suggested, in a paper published in a recent issue of *American Behavioral Science*, that while computer matching and profiling may be ferreting out some violators, others with sophisticated techniques may be acquiring a "license to steal."

Major categories of errors in computer matches identified by the researchers were erroneously reported or incorrectly entered data, time lag, computer hardware and software problems, decisions being made out of context and the probabilities involved in profiling that, in effect, make a presumption of guilt.

Data input errors

The authors cited many examples of error. When the Social Security numbers of over two million recipients of food stamps and payments from the Aid to Families With Dependent Children program were found to contain 5,100 instances of nonissued numbers, one-third of the cases were the result of data input errors. The

numbers had been transposed either by the applicant or staff.

In the first run of a Massachusetts bank records match, the authors stated that 24% of the Social Security numbers used were incorrect. The error rate was reduced to 7% by coupling the first letter of the surname with the Social Security number.

In New York state, a match of work records with a list of people receiving assistance in the last quarter of 1978 revealed that 10% of welfare recipients were actually working. In a second review, it was found that at least half of these people had legitimate reasons for working. The dates had not been updated in a timely manner.

Errors of interpretation may arise when data is not examined in context, or when "only a fraction of reality's richness is abstracted" in the data, the authors suggested.

As a result of the Massachusetts bank matching program, a nursing home resident lost her Medicaid eligibility. The woman's account included a certificate of deposit held in trust for a local funeral director to use for her burial expenses. Federal regulations exempt burial contracts from being calculated as assets, yet the trust was included by the match as part of her assets.

Data searching "may transform the presumption of innocence into an assumption of guilt," the authors stated, in which benefits could be cut

off without a hearing and "accusations become equivalent to convictions without a trial."

Data searches present a number of vexing civil liberties issues, the authors suggested. Privacy may be violated when "those subject to them [data searches] are likely to be unaware that any search is going on," by indirect or unwilling consent for having the search conducted, by improper disclosure of data to a third party and by weak security around data bases, the paper stated.

'Fishing expeditions'

Unreasonable search and seizure provisions of the Fourth Amendment may be violated by "fishing expedition"-type searches conducted without substantial evidence of wrongdoing by the person being searched, the authors stated.

Fifth Amendment guarantees of due process may be violated by the lack of notice that a search is being conducted, the authors suggested. A match conducted on federal student loans in August 1982 was not published in the *Federal Register* (where notice of a match for "routine use" must be published) until December 1982, the paper stated.

Data is lacking on the extent of

matching errors, such as the ratio of falsely accused people to those found guilty of violations, the validity of various profiles, the frequency of concerns raised by civil libertarians and studies showing whether benefits continue over time or become neutralized.

Fewer than one-fifth of U.S. states have laws requiring written standards for the collection, maintenance and exchange of data base information on individuals, the authors stated.

'License to steal'

Skilled violators will learn how to exploit the weakness of matching techniques, in effect earning themselves a "license to steal," the authors said.

"Some variables used in matching and profiling can be manipulated or avoided easily," the paper stated, suggesting that some Massachusetts residents were prompted to move money to out-of-state banks after the welfare-bank record match.

False identification is unlikely to be discovered, the report suggested. If a person uses the genuine Social Security number of another, the chances of being caught are "slight," the authors said.

Calif. officials still investigating primary's vote-reporting snafus

By James Connolly
CW Staff

SACRAMENTO, Calif. — Nobody knows all the reasons for what went wrong, or even why some things went right while others went wrong, but California officials are still investigating the failures of their vote-reporting system on June 5, presidential primary night.

That was the night that about 40 news organizations tried to get election results through terminals in the secretary of state's office and through personal computers on a dial-up network, only to find much of the data unavailable or delayed.

Causes have been found for some of the multiple breakdowns; others remain unexplained. Equally puzzling is the question of why state legislators could use their terminals on a comparable network to access data that reporters could not get.

Paul Virga, the secretary of state's office manager for data processing, reported that the June 5 problems stemmed from the difficulties of coordinating communications in the wake of the AT&T breakup, the complexity of the ballot, the inability to test the network and the 1983 death of a programmer who left no account of the reporting system procedures.

Part of the testing problem, according to Virga, was the inability to stress-test the new network, under which 28 newspapers, radio stations and television stations tried to access the vote results through a dial-up network.

"The primary reason for most of the problems was that for the first time, we were attempting to allow a large network of personal computers to dial into the data base. We hadn't

been able to do a true stress test because six of the 28 organizations didn't have their [personal computers] delivered until that day," Virga said.

Virga stressed that no data was lost and that 32 telephone operators who recorded votes from 58 counties on IBM 3270-type terminals experienced only a slight delay. But retrieving those votes from the system became a headache.

There were 15 ITT Courier Model 1700 terminals in the secretary of state's office that news organizations had paid \$1,500 to use in the primary and November general election to monitor voting in a statewide delegate count, a detailed count broken down according to the 45 congressional districts and individual districts.

The statewide "beauty contest" results and the detailed count by district were never available, and the reports for some individual districts were erroneous, in some cases showing "120% of precincts reporting." The results that the press could not get on their terminals were later produced in a delayed manner on a single terminal and printer in the secretary of state's computer room.

In November, Virga said, he will require a full test of the system and will try to use independent dial-up lines rather than rotary circuits on the communications end.

Caren Daniels, an office spokeswoman, who said there were no problems with primary races other than the Democratic presidential primary, added that the November ballot will be simpler and that for all of the headaches, the count was in at 4 a.m., several hours earlier than previous counts.

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NEWS

FCC lets lease rate hike stand, delays next increase

WASHINGTON, D.C. — Despite their violation of a previous order of the Federal Communications Commission, the higher terminal lease charges that AT&T Information Systems imposed last week will remain in effect.

That was one part of an FCC order issued recently. The other part delays the next hike in lease rates from May 1, 1985 to July 1985. The commission also indicated that an upcoming order may offer additional, possibly substantial, rate relief.

Last November, the FCC said that AT&T Information Systems, a deregulated subsidiary of AT&T, would have to continue leasing already installed terminals, officially known as embedded customer premises equipment, for two years after offering them for sale.

The rates charged during this "price predictability program" would have to be specified; increases could not exceed certain limits and could be imposed only at eight-month intervals after AT&T Information Systems offered the equipment for sale.

AT&T Information Systems, however, contended that these terms applied only to terminals not offered for sale on Jan. 1. For those that were put on sale the first of the year, it insisted that the order permitted an increase on that date and subsequently at six-month intervals.

Imposed increases
On the strength of this interpretation, AT&T Information Systems imposed an initial increase on March 1 and another on July 1. Both increases were vigorously opposed by the International Communications Association (ICA), a users group representing most of the nation's Fortune 500 companies.

On June 29, the commission issued two orders. The first rejected AT&T's interpretation of the November 1983 Customer Premises Equipment Detariffing Order. The commission said, "We did not intend any such distinction between [customer premises equipment] offered for sale on Jan. 1 and subsequently. . . . Regardless of the date of the initial sales offering, . . . we made it clear that the interval of lease rate adjustments would be eight months."

In the second order, the commission addressed AT&T Information Systems' contention that it would be too difficult to cancel the then upcoming July 1 lease rate increase and ICA's counterargument that since AT&T "recklessly disregarded" its responsibilities, "it must assume the consequences."

Already in the mail
The commission agreed with AT&T that it would be too expensive to retract the July 1 increase because bills assessing the higher charges had already been mailed. However, it offset the increased expense to users by specifying that the next increase in lease charges could not be imposed until July 1, 1985.

Under the commission's original order, the increase levied by AT&T Information Systems on July 1 was not due until Sept. 1. The next increase would have come on May 1, 1985.

"We must stress . . . that [AT&T Information Systems], in scheduling lease rate changes for July 1, acted solely on its own initiative," the commission said.

AT&T was "admonished for taking these unilateral actions in disregard of the plain meaning of the [Customer Premises Equipment] Detariffing Order. Such irresponsible action cannot be condoned, and [AT&T Information Systems] is cautioned to refrain from such action in the future."

IBM, Telenet challenge AT&T plan

WASHINGTON, D.C. — AT&T ran into more trouble last week in its protracted effort to bring Accunet Packet Service (APS) to market. The proposed APS rates reportedly are about half those charged by existing packet service providers.

IBM, in a statement submitted to the Federal Communications Commission last week, said AT&T should not be allowed to bundle switching and transmission into a single offering.

IBM's reason was that AT&T Communications, the APS provider, would gain an unfair advantage because it would also be leasing circuits to competing providers of public packet net services, such as IBM.

To get around this problem, IBM

said the commission should require AT&T to market APS through its deregulated subsidiary, AT&T Information Services, which would have to lease transmission facilities from AT&T Communications at tariffed rates.

GTE Telenet Communications Corp. contended that the reduced rates proposed for APS stem partly from discriminatory termination charges for access circuits and partly from usage rates that cannot be justified economically.

Citing AT&T figures, GTE Telenet said APS will cost at least 25% more than AT&T's existing Basic Packet Switching Service (BPSS), yet the proposed rates are "roughly half those of BPSS."

Divested BOCs deem court review of FCC inaction 'inappropriate'

WASHINGTON, D.C. — For years, independent terminal makers tried to get the Federal Communications Commission to declare that maintenance of service charges are illegal. When the commission failed to act, the terminal makers took their complaint to the U.S. Circuit Court of Appeals for the District of Columbia.

At stake is a charge of up to \$68 per hour, which is incurred by AT&T customers who use independently made terminal equipment. The charge is levied whenever an AT&T service technician responds to a trouble call and finds that the fault lies within customer-provided equipment. Independent terminal makers say this charge is unfair because it is not imposed on AT&T terminal users.

AT&T argues that users of its terminal equipment do pay for maintenance of service, claiming that it is included in their monthly lease/rental fees. According to the independents, however, AT&T has never specified the amount of monthly fees assigned to repair service, nor has it demonstrated that the fees collected cover the relevant costs.

In the latest phase of this argument, the divested Bell operating companies said that even if "agency inaction may be deemed the equivalent of a denial of relief, it is inappropriate" for the court to act because legal precedents allow court intervention only when administrative inaction occurs "in the context of exceptional circumstances relating to human health, safety or welfare."

Democrats' industrial policy jeered

WASHINGTON, D.C. — In the latest Republican attack on Democratic proposals for an "industrial policy" to reinvigorate the U.S. economy, Rep. Daniel E. Lungren (R-Calif.) charged that the industrial policy movement is misguided, based on overly pessimistic economic assumptions and politically motivated.

Lungren released a report by two economists at the Joint Economic Committee that buttresses the GOP view that the U.S. economy is resilient and responds better to market incentives than to centralized government planning.

Lungren endorsed the alternative policy recently proposed by the House Republican Task Force on High-Technology Initiatives, chaired by Rep. Ed Zschau (R-Calif.).

Among other things, the GOP policy favored tax incentives for research, strengthening copyright and patent rules and a general reduction in federal regulation of business.

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NEWS

Strategies outlined for micro use in government shops



**CW AT GOVERNMENT
COMPUTER EXPO '84**

By Mitch Betts
CW Washington Bureau

WASHINGTON, D.C. — Information systems managers at government agencies, faced with the explosive growth of end-user computing, should avoid the temptation to place overly restrictive controls on microcomputers. Instead, they should involve end users in all phases of managing the micros, according to Madeline Weiss, president of Weiss Associates, Inc., a consulting firm here.

Speaking at the recent Government Computer Expo '84 Conference here, Weiss outlined a strategy for managing the proliferation of micros that is more permissive than restrictive. "Implement guidelines and provide support, rather than seek control," Weiss said.

Independent users typically turned to micros in order to avoid dealing with DP professionals and their applications backlog, she noted. "Don't overreact to micro expansion with overly restrictive controls — that just creates conflicts with the users," she said.

She suggested that a committee of DP professionals and users be formed to establish guidelines for micro implementation, for example, by striking a deal that users who acquire compatible micros and follow other rules can get a micro-mainframe link,

while the others must "go it alone."

In addition, the DP shop should agree to provide support for the independent users and establish user groups and an information center, Weiss said. DP shops should permit users to chair project teams, policy committees and testing and evaluation teams, she added.

"Such role changes are difficult, particularly for systems professionals who, research has shown, have a low need for social interaction, tend to be remote and impersonal and often lack empathy for users," she said. "Nonetheless, systems professionals can learn to develop their interpersonal and collaborative skills."

Weiss explained that this wide-

spread involvement of users in the micro strategy reduces user resistance to policies, increases user commitment, produces better solutions and increases user knowledge.

Another key element of the integrated micro-mainframe strategy is to obtain the full commitment of the senior management. "It is often up to information systems managers to do so," Weiss said.

Sometimes, she said, senior management concludes by itself that some coordinated program is needed, but more frequently it is the DP manager who must do the persuading. One way to accomplish this is for the DP manager to circulate articles on how other organizations — perhaps

competing firms — have effectively solved their problems, she said.

Also, senior managers tend to get involved in the micro planning if they have a microcomputer on their own desk, according to James Anzalone, a principal in the Washington, D.C., office of Arthur Young & Co.

But this ploy also has its problems, because many top-level executives feel that sitting behind a keyboard is demeaning, or they fear looking silly when they make mistakes, added Henry Petersohn, an author and consultant on office automation.

One solution, Petersohn and Weiss maintained, is to offer to train executives in their own offices, where they will feel safe enough to experiment.

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House approves donor-patient data registry

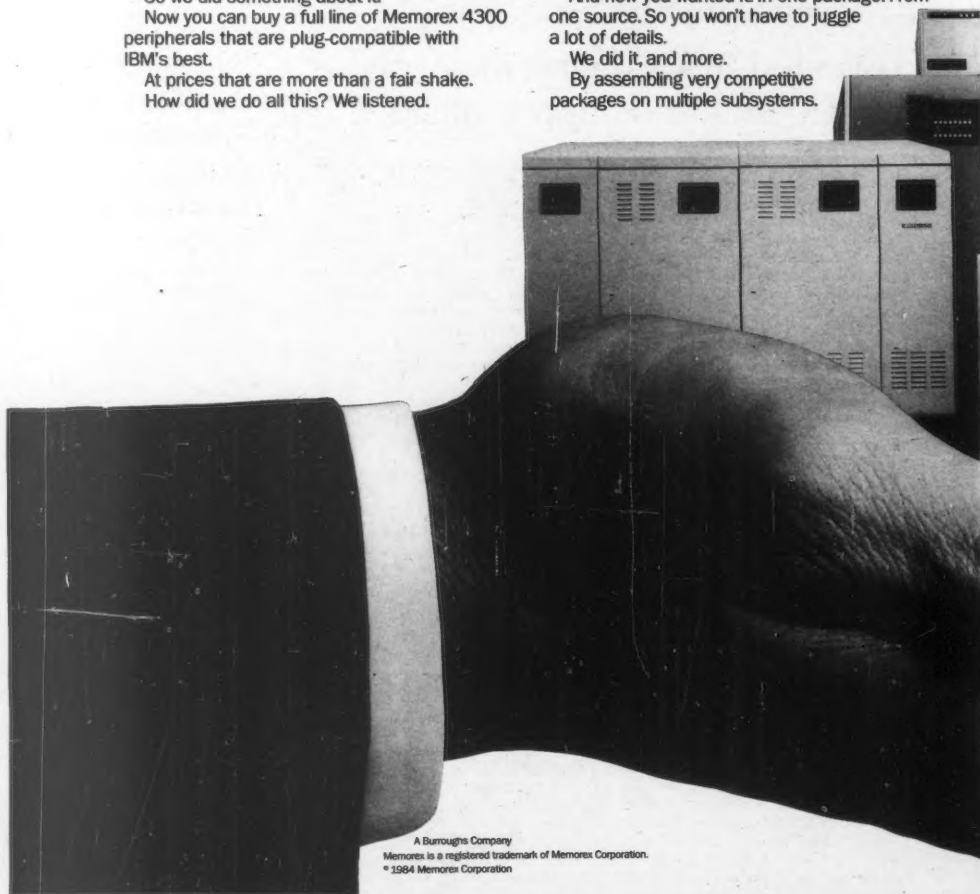
WASHINGTON, D.C. — The U.S. House of Representatives recently approved legislation that would create a computerized registry to help doctors match heart, liver, lung, kidney, pancreas and bone marrow donors with would-be recipients.

By a 396 to 6 vote on June 21, the House approved an organ transplant bill (H.R. 5580) designed to increase the effectiveness of existing private and government organ transplant programs.

Sponsors said the legislation is needed because nationwide searches and pleas made through the news media and civic leaders often fail to locate organ donations in time to help needy patients.

The legislation requires the U.S. Public Health Service to create a United States Transplantation Network to "maintain a national list of individuals who need organs [and to] provide, through the use of computers, a national system to match organs and individuals included in the list."

The Senate version of the bill merely authorizes a study of organ transplant issues, so the legislation will now go to a House-Senate conference committee to resolve the differences.



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NEWS

Micro info centers seen catching on in federal offices



**CW AT GOVERNMENT
COMPUTER EXPO '84**

By Mitch Betts
CW Washington Bureau

WASHINGTON, D.C. — Twenty federal offices throughout the area here have established information centers to provide instructional and technical assistance to hordes of federal microcomputer users, Coyeen R. Lawton, deputy director of information technology at the U.S. Department of Labor, told attendees at the recent Government Computer Expo '84 Conference here.

"Information centers are taking hold here in Washington," said Lawton, who warned DP shops not to resist the centers, but to view them as welcome relief from the burdens of dealing with micro users' small application problems. DP shops that resist the trend may find that users will create a center for themselves anyway, she added.

The centers have been established mostly in the last two years at such organizations as the Veterans Administration, the Food and Drug Administration, the Department of Agriculture, the Environmental Protection Agency, the Securities and Exchange Commission, the Library of Congress, the Army, the Navy, the U.S. Postal

Service, the Labor Department and the House of Representatives, she said.

Lawton, who has more than 10 years' experience in federal DP offices, said her primary message to other government agencies is this: "If you don't have an information center in your organization, you probably need one."

Several speakers at the Government Computer Expo stressed that information centers are key elements to successful management of the proliferation of micros in government offices. "Information centers are used to teach people how to use their own computer power," Lawton said. "Decision makers need tools and a place

to learn about them," she said.

The concept of information centers was created about four years ago by IBM as a way to cut the main-frame applications backlog by reducing managers' total dependency on the DP shop, but now the centers focus on micro users, she said.

The government's information centers typically have a library of vendor brochures, software, microcomputers for training and tryouts, classes, buying guides, a newsletter, a telephone hot line and a small but helpful staff to handle inquiries.

Lawton observed, however, that there are many variations in the information centers at federal agencies. "Every organization is different, and no two information centers are alike — and they don't need to be," she said.

Some agencies have centers limited to a hot line and a newsletter for sharing micro programs, while others — such as the Agriculture Department and the Veterans Administration — have "full service" information centers that also provide demonstrations, tours, classes, a library and users groups, Lawton said. Moreover, some centers use in-house staff, others use contractors and still others have a hybrid staff of in-house personnel and contractors, she said.

Once a center is established, Lawton said the biggest challenge is to develop a qualified and motivated staff.

Staff members should be patient with novices, technically qualified and able to communicate with micro users so there is a "community feeling," she said.

"Once you open an information center, you find you have a whole new community flooding you with questions. And it's very rewarding," Lawton said.

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Congress OKs SBA crime bill

WASHINGTON, D.C. — The U.S. House of Representatives and the Senate recently gave final approval to legislation authorizing the Small Business Administration (SBA) to offer training and education to small businesses to help them combat computer crime.

Under the bill, the SBA is to establish a Small Business Computer Security and Education Program to disseminate information about the causes and nature of computer crime and to offer education about computer security.

In addition, an advisory council made up of government and other representatives will be created to advise the SBA on computer crime issues.

The bill — which President Reagan is expected to sign into law — will for the first time enable the SBA to join with private, profit-making enterprises to cosponsor seminars on computer security.

The House and the Senate reconciled their differences on the bill on June 27 and sent it to the president for his signature.

NEWS

ANNOUNCE from page 1

al DBMS that will not be available until the end of this year.

But according to interviews with more than two dozen vendors, users and consultants conducted recently by *Computerworld*, the technique has recently become notably more popular.

"The last year or so has seen a far more serious bout of occurrences of dramatic preannouncements, I think largely spawned by the personal computer movement," said Vaughan Merlyn, a consultant and vice-president of the systems software division at Walker Interactive Products, Inc. "Suddenly, all the system software vendors found themselves having to react to a phenomenon they hadn't seen coming."

Atre said, "We are now in the trend of preannouncing. This is true especially when some area like relational data bases or micro-mainframe links becomes popular. When something becomes a big marketing issue, that's when people start to preannounce."

Observers agreed that users are often neglected in the announcement battle. "To get a sale, the vendors will promise you anything," said Len Bergstrom, vice-president of Real Decisions Corp., a consulting and market research firm. "We've seen people waiting for things to come in so they could develop certain applications. They get halfway through and have to just stop."

Atre observed that users who make concrete plans based on an early announcement are risking the embarrassment of having to back out if the vendor fails to come through. "It doesn't look good for the decision maker [in a user company] to go back to his manager and say 'It hasn't worked, and we want to back out,'" Atre said. "It damages the credibility of the user who made the decision in the first place."

A classic case

Early announcement activity becomes hot at about the same time as new technologies do. Last year's deluge of micro-mainframe link announcements is a classic case.

Early last spring, Informatics General Corp. unveiled Visianswer, a micro-mainframe link, for delivery in November. At about the same time, Applied Data Research, Inc. (ADR) announced its Visicorp Visi-On-based link, with a shipment date of early 1984. On-Line Software International, Inc. announced its Omnalink software in April, fully eight months before delivery. McCormack & Dodge Corp., too, unwrapped its Interactive Personal Computer Link six months before shipment. Other companies have followed suit.

Often, early announcements go against the grain of a company's philosophy. But vendors contacted by *Computerworld* agreed that market pressures have made such statements of direction a necessity.

"[We announced Omnalink early] because we felt it would put us at a competitive disadvantage if we didn't," said Jack Berdy, president of On-Line.

Carol Hays, manager of marketing communications at Informatics General, said, "We knew that other companies were likely to announce similar products [early], and we wanted to be among that group."

Hays noted that early announce-

ments tend to create a domino effect, causing vendors to scramble for a share of the publicity created. "If you were to announce your product six months later, you [would] take the risk of losing that initial wave that carries forth a share of the customer's mind," she said.

Another recent area of early announcement activity has been relational DBMS and their related application development tools. In addition to Cullinet and IBM, Cincom Systems, Inc. and ADR have been responsible for making announcements well before products were ready. ADR's Ideal product was first heralded by the vendor in 1980, two years before its planned release and three years before its actual release. "It turned out to be a bigger job than we thought," said Martin Goetz, president of ADR.

Cincom revealed to a user meeting in 1978 that it was working on TIS, a major DBMS and application development system. The product was not delivered for more than three years. "The anticipation we built was the kind that had customers saying, 'We like it. Give it to us,'" said Don Campbell, Cincom's manager of corporate marketing and product planning. "There was a tremendous amount of pressure on us to announce a new direction. But we were optimistic relative to the amount of time it would take to develop the products."

Vendors almost unanimously agreed that early announcements are OK as long as the products are delivered on time. Cullinet, for example, has vigorously defended its April 19 announcement by pointing out that its products will ship on July 23, three weeks after the original target date. "Making an announcement is not as important as delivering on it," said Robert Goldman, Cullinet president.

Goetz said, "I think there is legitimate basis in many cases for customers to know what you're coming out with, both for planning purposes and in case they are thinking of going somewhere else. If companies announce and don't deliver, it's going to be a smear on their record. I think the independents have a pretty good record."

However, others believe the track record of software companies is mediocre at best. "Software vendors have almost never delivered software on time, although they have a pretty good record in the last three or four years," said George Schussel, president of Digital Consulting Associates, Inc. Walker Interactive Products last year adopted a new announcement policy after deciding that the announcement phenomenon "had gone so haywire that everybody was for all intents and purposes putting out an awful lot of smoke and mirrors and very little real product," according to F. Kirk Brennan, director of marketing.

Under the new guidelines, "Until we have a fully deliverable product, we will not announce," he said. Brennan admitted that Walker "historically [has] had a tendency to preannounce quite early." But he added, "I think our record is no better or no worse than most of the competition."

Users, too, have indicated that they are taking most early announcements with a healthy dose of skepticism [see story on page 15]. As a result, there are indications that the trend is reversing itself.

Applied Data Research, Inc.

"If we have detailed specifications, we will announce implementation, have announced delivery dates and preliminary pricing, then we'll announce before the product is shipped if it's in the company's best interest. It's in our best interests if our competition announced before we did or if we think it's important for planning purposes."

"There's a difference between announcing to the public and putting it in a newsletter to our own customers and prospects. It's appropriate to tell customers about what's coming out. But we won't have a press release until those requirements have been met."

— Martin Goetz, president

Cincom Systems, Inc.

"We launch a product, at minimum, when we can demonstrate it. We are within 30 days of release, if not already at that point. Announcement to the customer base may be on a personal, pre-basis where we give them a prototype of the product. But for an industry announcement we would have had to have gone through the beta test stage and have all of the integral components of internal documentation and all of the education available. When we announce a product we are ready to go into controlled release."

— Don Campbell, manager, corporate marketing & product planning

Computer Associates International, Inc.

"We do not preannounce products. With the exception of CA-Executive [announced in January, 1984 for shipment in June] we've never done it. Executive was a special case. We did depart from our traditional policy."

— Arnold Mazur, senior vice-president, marketing

Computer Corp. of America

"Our policy is based on four things that must be in place before an announcement is made. They are: detailed functional specifications; development project plan and schedule with resource allocation; support plan and schedule; and a demonstrable prototype of some of the major functional capabilities. They do not have to have [been] tested at a beta site."

— Bert Weimiller, vice-president, marketing

Comshare, Inc.

"Our policy is that until a product has been released for marketing, we will not announce it."

— Kevin Kalkhoven, group vice-president

Cullinet Software, Inc.

"We feel an announcement is appropriate when delivery dates have been established. Those dates are for beta and gamma test and general release. They are generally three months apart. Those dates are sacred to us and we'll extend ourselves to meet them."

— John Cullinane, chairman

EPS, Inc.

"We have two types of product announcements. Major enhancements to existing products are announced as they are going out the door to the customer base. When it's a full new product we make a general press announcement when it enters the beta test stage. We announce that it has been installed but is not ready for commercial delivery. Typically a beta stage is three to four months before delivery."

— John Kopcia, international vice-president of research and development

Informatics General Corp.

"We don't have a formal policy in writing. But our general feeling is that traditionally in the computer industry companies have preannounced products before they were going to ship and that that tradition is changing and should change."

— Carol Hays, manager of marketing communications

IBM

"We announce each program product when it's ready in relation to the technology, the quality, financial and marketing aspects. That can range from 18 months or slightly longer for very complex programs that may be tied in with hardware, such as MVS/AA, which was announced with the 3081."

"However, on something like a program offering, announcement and availability may be on the same day. Some programs may be the next day, some may have a two-month difference from announcement."

— Steve Carpenter, program administrator

The software firms represented here were chosen because of their leadership positions within the industry and because they offer a broad range of products. Their selection does not imply a history of early announcement activity.

"My experience is that more and more of the DP departments are coming under pressure to be able to get the package they select up and running in a definable time frame," said Wayne Pierce, manager of the software intelligence group at Arthur Andersen & Co. in Chicago. "People will wait just so long before they say, 'To heck with this. I want my money back.'"

Other vendors have reconsidered their policies after coming close to shooting themselves in the foot. Computer Associates International, Inc. "made a mistake" by announcing CA-Executive — a package of integrated microcomputer software with a mainframe link — in January 1984 for delivery in June, according to A. David Tory, the firm's senior vice-president of planning. "We created an interest we couldn't fulfill, which is not the usual practice for Computer Associates. The salesmen got hyped up and couldn't have it."

Tory said Computer Associates did not suffer financially from the early release of CA-Executive, but admitted that the lag time created some problems in the sales force.

"Now that the product is ready, the salesmen are saying 'Ho hum, it's Executive again.' So now we've got to sell it again," he said.

Computer Associates and other vendors have begun to proclaim publicly that they will not announce new products unless availability is imminent. "It's now becoming a unique strength for a vendor to say, 'Hey, you know our policy is we only announce what is deliverable,'" Walker's Merlyn said.

Another factor in the backlash has been the increasing sophistication of the software itself. With vendors like ADR and Cincom now admitting that they underestimated the development times for major products by one-third to one-half, vendors in the future may take a more cautious attitude toward announcing "breakthrough" technologies.

"There's always the chance for maybe 5% of [the product] not to work, but you don't find that out till the final testing phase," Pierce said. "And that 5% can take as much effort as the previous 95%. It has caused [the vendors] to rethink what has already been released."

NEWS

Management Decision Systems, Inc.

"We work through our service and support staff in the regional offices as well as through user groups to let our client base know what we're working on. We will always give release date information at that time. We tend to share a lot more information with our installed client base than with the general marketplace. We don't announce to the general marketplace until the product has operated well in the field version. The final release is probably three months or less away from that."

— Bruce Donath, vice-president, sales support

Management Science America, Inc.

"In mainframe computer products, we don't announce publicly until we have been in beta site. We do review forthcoming products with customers at user meetings. We have customer advisory groups that work with a company while a product is being developed."

"In the micro area, we will announce four to six weeks before shipping."

— Dennis Vohs, vice-president, research & development

Mathematica Products Group, Inc.

"Typically we announce things much earlier to our customer base than we do to the public at large. When we make announcements to our customers once a year we're using a horizon of about 18 months. With the press we tend to make an announcement as we are delivering."

— Paul Grabscheid, director of marketing

McCormack & Dodge Corp.

"We will not announce a product until we have a demonstrable system, which in the on-line environment means it is a real system that can be seen and touched and questions can be asked based on what's being demonstrated. It does not necessarily mean it is packaged and ready to be delivered. I would say on the average it's three to six months before delivery."

— John Landry, senior vice-president, research and development

On-Line Software International, Inc.

"Except for one instance, we've never announced products prior to 90 days before their availability for shipping. The one exception was Omnilink, which we announced in April for December delivery."

— Jack Hardy, president

Pansophic Systems, Inc.

"I'll break it into two separate categories. We will talk about what's in the next version of a current software product. The reason is that customers want to be able to make their plans in the next six months. For products that have yet to be delivered, we don't talk about any of them, except that we will talk strategically to our customers about where we're trying to go. But to say we'll have a product available 12 months from now, we have never done that."

— David Eskew, president and chief operating officer

SAS Institute, Inc.

"We don't believe it's a good idea to announce far in advance [six months to a year] of test-level products. In general, SAS announces no more than six months before general release."

— Iona Caswell, marketing manager

Software AG of North America, Inc.

"We don't like to [make early announcements] but we're forced into it sometimes because competitors do it. But we don't go with that policy at all. If our competitors are preannouncing a product and it looks like we're not in the market, in self defense I think [we would] do it."

— Connie Mays, director of marketing

Uccel Corp.

"Over the years we have adopted a policy of not announcing until something is almost in beta test. Generally that comes out to two to three months before release. We've abided by this through all the years we've been in business."

— Marie Smith, vice-president of marketing, systems software division

Walker Interactive Products, Inc.

"Until such time as we have gone through beta test with the product and have documentation that is useful so that for all intents and purposes we have a fully deliverable product, we will not announce."

— F. Kirk Brennan, director of marketing

The software firms represented here were chosen because of their leadership positions within the industry and because they offer a broad range of products. Their selection does not imply a history of early announcement activity.

New release fiasco turns to gain

By Paul Gillin
CW Staff

BALTIMORE — Using a new version of a Honeywell, Inc. operating system that had been recently released but poorly tested "just about put us out of business," the director of software engineering at a large fleet management firm here told *Computerworld* recently.

However, the company responded to the near-disaster in an unusual way. It elected to become a beta test site for future software products from Honeywell.

Peterson, Howell & Heather, Inc. installed an early version of Honeywell's Gcos 8, Release 2000 software in December 1982, about six months after the product began shipment. The company quickly discovered that although the operating system ran well on small jobs, it had not been adequately tested in a large on-line environment like that at Peterson, Howell, according to James Brown, the software engineering director.

Originally planned for testing

"We came up for 11 minutes on a Saturday and the [transaction processor] brought the whole system down," Brown said. Brown said the company's original plan was to use the new release of Gcos 8 strictly in a test environment. However, a manager convinced the data processing department to install the new software on a production mainframe that weekend, he said.

See EARLY page 16

Users found wary when faced with preannouncement blitz

By Paul Gillin
CW Staff

Colorful advertisements, splashy promotions and promises from salespeople are far less important than a hands-on demonstration, users told *Computerworld* in recent interviews. For that reason, early announcements from software vendors are not taken too seriously.

"Early announcements should carry very little weight, unless you're in a situation in which you have no other option, you feel like you can't make it yourself, there aren't any other vendors of the product, you're in dire need and you feel you have to put all your eggs in one basket," said George Priest, senior vice-president of data processing at Southland Life Insurance Co. in Dallas. "My philosophy is to go after the tried and tested products."

Priest, who used to work for IBM, said his experiences there have made him jaundiced about the whole early announcement issue. "It came to be used as a ploy or a knockoff so much that, to my way of thinking, it lost its credibility," he said. "At this point, I have to touch and feel [the product] and watch it before I put a whole lot of credence in it."

Another user concurred with the opinions of some vendors that early announcements are important to his planning. "If they say they're planning to do something and it'll be a year and a half away, that's perfectly all right as long as you understand it up front," said Stephen Taylor, director of information services at the *Boston Globe* in Boston. But Taylor added that an announcement means little without technical specifications. "Generally, the [vendor's] sales force knows less about what they're going to produce than your own engineers can learn by dealing with their engineers. The best safeguard is as

much in-depth knowledge of the actual engineering group as you can get."

Taylor said his group has had, "a plethora of problems, from a wide variety of vendors, of not meeting delivery dates," particularly third-party software vendors. In one case, he said, a failure to deliver caused the company to purchase a somewhat inferior product in order to service the users. News of a vendor's failure to meet deadlines can spread quickly throughout the user community, he added.

A bad experience at a user site at a major Massachusetts company has prompted a more cautious attitude toward vendor claims of future directions. The user, who asked to remain anonymous, said his company waited over a year for an IBM VM version of a mainframe spreadsheet. The product was promised in July 1982, but was not available until early this year, he said. Ultimately, his company purchased a product from another vendor.

"One of the major reasons we wanted a spreadsheet on the mainframe was so we could set up ways of communicating data to different spreadsheets and also present standard front ends [canned spreadsheet models] for various functions," the user said. "We're just now beginning to address that problem. Not knowing what kind of spreadsheet we would have was frustrating."

Noting that he will take future announcements from the spreadsheet vendor "with a little bit of salt," the user said he has learned from the experience. "The key is to buy off-the-shelf software and get what you want. If something promises to be out in six months, then the best thing is to say, 'Fine, I'll look at it six months from now.' There'll always be something new on the horizon."

Consultants advise caution

By Paul Gillin
and David Oimos
CW Staff

How can you avoid getting burned by an early announcement? If at all possible, do not become one of the first users of the product in question, consultants unanimously advised.

Beta testing of a new product can be extremely risky unless the product is kept in strict test mode for some months, the consultants noted. Unless you are desperate for the features of the new product, you should wait until field experiences are available.

"Be conservative. Buy only what exists and take the risk of being out of date," said Jim Davey, a senior research associate at Digital Consulting Associates, Inc. in Wakefield, Mass. "Be constantly out of date, in fact."

"We do not recommend someone going with the latest release of a package until there are people in the marketplace who have taken the jump first," said Wayne Pierce, man-

ager of the software intelligence group at Arthur Andersen & Co. in Chicago. First users should be "the ones who have found a feature or function they find necessary for them and who have no other alternative than perhaps to go custom."

Beta test sites need not only technical expertise, but also spare time, money and a commitment to the product being tested, said Shaku Atre, president of Atre International Consultants, Inc. in Rye, N.Y. Unless you have those resources available, avoid the test-site route, she said.

Several consultants stressed the need to obtain references before making the decision to install a new product. Len Bergstrom, a vice-president at Real Decisions Corp. in Stamford, Conn., advised that you should look for a similar environment to your own and be prepared with specific questions. "Ask questions about certain characteristics of the products and mostly how responsive the vendor has been," he said.

NEWS

Most vendors say they give users early product news

By Paul Gillin
and David Olmos
CW Staff

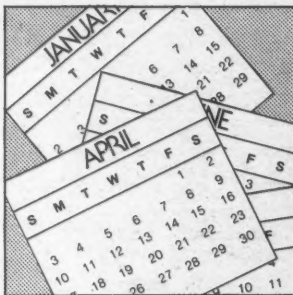
Even vendors who wouldn't think of announcing a new product before beta testing will give their users a peek at development projects long before the general market sees them, according to interviews with 19 vendors recently conducted by *Computerworld*.

In some cases, users will get as much as a four-year advance notice of future products, vendors said. The reason is that users tend to identify closely with their primary software vendors.

"The software business is a very peculiar one in that when you make a

decision to go with a major software company, you are sort of buying into their future development. And people want to know what those developments are," said Paul Grabscheid, director of marketing at Mathematica Products Group, Inc. He added, "The feedback we get by announcing our intentions sometimes causes us to modify what we were planning on doing."

Pansophic Systems, Inc. will freely discuss the next release of a current product with its user base, but won't announce a brand new product until alpha testing has started, according to David Eskra, president and chief operating officer. "It's pretty well known what the future



releases will entail," Eskra said. "We will talk strategically to our custom-

ers about where we're trying to go product-wise. But until a new product gets to alpha test, it's not really clear [whether] you're going to be able to meet all the things you think you can."

Martin Goetz, president of Applied Data Research, Inc., said, "There's a difference between announcing to the public and putting it in a newsletter to our own customers and prospects. It's appropriate to tell customers about what's coming out. But we won't have a press release until those requirements have been met."

A different opinion

However, one major vendor disagreed.

"I don't distinguish between announcing to the world and to a group of clients," commented John Cullinane, chairman of Cullinet Software, Inc.

Robert Goldman, president of Cullinet, said a public company should not play favorites with its users. "To make [an] announcement to a select group of people as a publicly held company is frowned upon," he said. "You have a certain responsibility to your shareholders and everybody else that you don't disclose to a select group of people."

EARLY from page 15

"Sure enough, on Monday it stayed up for 11 minutes and then went up and down like a yo-yo," he said.

Honeywell engineers traced the problem to a hardware malfunction that was causing problems with a move instruction.

"We were losing data. I was really upset because it was screwing up my data base," he said. "Honeywell finally sent out a hardware engineer who knew what the problem was. He soldered two wires together and that solved the problem. But that was five days later."

No grudges held

Brown said he holds no grudges against Honeywell for the malfunction. In fact, Peterson, Howell has taken the unusual measure of becoming a kind of full-time beta test site for Honeywell software. Using a Honeywell DPS 8/70 on loan from the vendor, Peterson, Howell's DP shop has beta tested a number of new packages.

The advantage for his company, Brown stated, is that the user can work with Honeywell to get a virtually customized piece of software.

In addition, "Honeywell has been much quicker to respond to our problems," he said. "It can take so long to make changes when you're just a member of the general user community."

Brown cautioned that users should not rush into becoming a controlled release site. "You need a person you can put on the job full time," he said. "It costs money, but you can wind up with software that works the way you work."

But he added that the operating system experience has left him wary of new software releases. "If anything new hasn't been tested out, I'm not going to bring it up [in production]," he said.



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**FLORIDA
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NEWS

Republican convention set to test telecommunications

By James Connolly
CW Staff

DALLAS — With an eye toward the 1988 convention, Republican delegates will test electronic message systems when they meet here in August to renominate President Ronald Reagan.

Technicians have begun wiring the Dallas Convention Center with more than 60 miles of cable and installing more than 5,000 telephones to serve Republican National Convention officials, the news media, party delegates and alternate delegates.

But the party also will use the 1984 convention as a testing ground for messaging systems and a cellular radio network.

Main focus

"The main focus of the technology is to help people plan better. The 1984 convention isn't contested, so the Republicans can do things and evaluate whether they might be helpful in 1988," reported Dallas communications consultant James Blythe, who is advising the convention officials on the project.

"Four years ago, every single message was stuck on a message board, stuck in a slot or, if important, hand carried by a page. There will still be some that are hand carried, but we think that most messages can be delivered electronically," he added.

Managing the project are AT&T Information Systems and AT&T Communications. They are coordinating eight other vendors in a \$2 million project that will cost the convention a fraction of its value.

Following the example of the Los

Angeles Olympic Committee, the Republicans are designating the 10 vendors as "official" participants in the convention for advertising purposes. In exchange, the convention is receiving \$1.2 million to \$1.5 million in services and equipment at no charge.

AT&T Information Systems is installing its System 85 digital telephone system for the conventioners, bypassing the convention center's existing AT&T Centrex system. Southwestern Bell Telephone Co. will provide the dial tone.

Message center

AT&T Communications will provide long-distance service and, together with Compucorp, coordinate

the message center. That message center will use the System 85's digital telephones and Compucorp's electronic mail system, based on Compucorp's 799 stand-alone word processors and Omegamyte terminals.

Twelve message center operators will help delegates place international calls, set up conference calls and perform other traditional services. They will also key messages into the Compucorp terminals for transmission to 50 Omegamyte terminals — one with each delegation on the convention floor and others with convention officials — and to Compucorp terminals in the Loew's Anatole and Hyatt Regency hotels, where the

presidential party and GOP leadership will be headquartered.

The floor terminals have been adapted so that acrylic housings will glow when messages are received. Those messages may cover such broad topics as schedule changes, caucus announcements or individual messages.

In addition, a voice messaging system from VMX, Inc. will be linked to the System 85, allowing delegation chairmen to receive their messages throughout the city.

Also, chairmen and convention officials will have the use of 50 to 100 cellular radio units from Southwestern Bell for two-way communications throughout Dallas.

Meet to focus on BOC impact in CATV mart

ARLINGTON, Va. — A conference to examine the opportunities and impact presented by the entry of the divested Bell operating companies into the CATV market will be held here Sept. 12-14.


"Telco Strategies for Cable TV Entry: Competition or Cooperation for the '80s?" will focus on the regulatory issues and line of business restrictions limiting the divested operating companies, as well as the state of the technology and the divested operating companies' readiness for joint CATV ventures in broadband, satellite and two-way CATV transmissions, according to the conference organizer, Telestrategies, Inc.

A preconference seminar on "Two-Way Cable TV" will include an introduction to the CATV business, an overview of two-way CATV technologies and a discussion of case studies in the CATV business, the organizers said.

The seminar will be conducted by Jerome G. Lucas, Telestrategies' president.

Registration fee is \$1,095.

Further information is available from Telestrategies, Suite 102, 6842 Elm St., McLean, Va. 22101.



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NEWS

How the Help system evolved

SALT LAKE CITY — Cardiologist Homer Warner, of the Latter Day Saints Hospital here, started out wanting to create a system that would help nurses when they experienced a crisis in his hospital's cardiac unit.

What Dr. Warner eventually helped create was the Help system, a medical expert system unlike any other because of its merging of advice-giving software with software for recording everything from patients' accounts to their conditions.

Warner spearheaded the development of the Help system 15 years

ago, when he and a team of doctors under his direction programmed a computer with a data base of expert knowledge regarding heart disease. They tested the system's advice against the recommendations of a group of physicians who regularly dealt with heart patients, including some cardiologists, and found it outperformed all but one of them, Warner said.

In the end, 4,000 modules of expertise were added to Help, making it what Warner called the most extensive medical expert system available.

Expert system helps guide

By Edward Warner
CW Staff

ELMIRA, N.Y. — It is a choice that could mean the difference between life and death: What drug should a physician prescribe and how much of it?

With an unusual illness or with new or obscure drugs, the decision becomes even more difficult, but doctors at Arnot-Ogden Memorial Hospital here can get an expert's advice in seconds — and never meet their benefactor.

The advice comes via the hospital's Help system, a computerized medical expert system that links the hospital's testing facilities, pharmacy and patients' rooms. When it is

fully operational in August, the Help system will not only advise physicians about drugs, but will also consider preliminary data entered about a patient and suggest the proper tests to run and what that patient's illness might be.

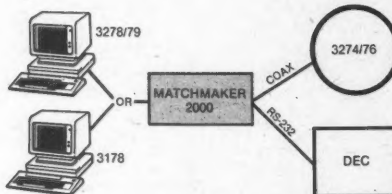
Such a system has been in use at Latter Day Saints Hospital (LDS) in Salt Lake City in various forms since 1973. A team of doctors from the hospital and the University of Utah School of Medicine, led by Dr. Homer Warner, developed the Help system to integrate all of a hospital's computer application needs, from mundane patient account keeping to critical, on-the-spot advice on each patient's care.

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Utah facility relies on Help

SALT LAKE CITY — The Help system is pervasive at the Latter Day Saints Hospital (LDS) here.

Electrocardiograms (EKG), which test for heart ailments, are input directly from the EKG machine into the Help computer and, within seconds, are analyzed and provided to the attending physician's terminal. Blood gas readings, which tell of heart ailments and test respiratory functions, are also entered directly to the Help computer from the testing machine.

"It's as though [the doctor] were consulting with others as soon as he gets back from the lab," said Dr. Homer Warner, leader of the team of LDS and University of Utah School of Medicine physicians that developed the system. Warner is chairman of the hospital's department of biophysics and the school of medicine's department of biophysics and computing.

When a doctor at LDS orders X-rays for his patient, the Help system considers all the data regarding the patient in question and advises the doctor as to which X-rays will be needed and even what the X-rays might find, Warner explained. A similar course of action occurs when the Help system responds to a doctor's prescription for drugs. The Help system reminds the doctor of the drug's potential side effects, considers the patient's other data and can recommend that lower dosages be administered or that the drug not be used at all.

Such an extensive data base requires a massive storage capacity and extensive hardware. LDS houses its Help system on six Tandem Computer, Inc. Nonstop II CPUs, with 1.3 billion bytes of disk storage and 250 terminals.

The only hang-up with Help at LDS, Warner said, is that it has come to play a key role in the work of physicians there. When the hospital shut down Help a few years ago to reconfigure its computer system, Warner said, LDS doctors took a vacation from performing surgery for two weeks until the Help system came back on-line.

NEWS

hospital's physicians through life-and-death decisions

Over 350,000 patients have received the Help system's benefits, Warner said, including Dr. Barney Clark, the recipient of the first artificial heart. Data on Clark's condition was transferred over phone lines to LDS from the University of Utah Medical Center, where Clark was being treated.

In 1980, the Help system went public. Control Data Corp., in exchange for a grant to LDS, gained the right to market the system to hospitals such as Arnot-Ogden Memorial, the first hospital other than LDS to implement it, and the University of Utah Medical Center, which will bring a Help system on-line this year.

Arnot-Ogden Memorial paid \$1.5

million for its Help system, which it began to implement in October 1983. Hardware for the hospital's Help system includes 90 CDC Viking 754 terminals; 60 printers; and five Tandem Computers, Inc. Nonstop II computers, each with 2M bytes of internal memory — all linked by 10 miles of cable.

The system will pay for itself in less than a year, said William Ritter, the hospital's treasurer, because of its accurate tracking of each test performed on a patient. This will ensure correct billing for all of a patient's tests, he noted. The hospital, like all others nationwide, is now under the pressure of recent federal Medicare guidelines that ban payment for tests



A Help system terminal in use

that the patient's illness does not usually warrant. As a result, the Help system "is a real cost-containment mechanism," warning physicians against wasteful testing, Ritter said.

That cost-containment benefit is

also extended to the patient. When an Arnot-Ogden physician prescribes a drug for a patient, he does so generically; the Help system responds with the brand name of the cheapest version of that drug available in the hospital pharmacy. The doctor then orders the drug from the pharmacy via his terminal.

The best feature of the Help system, though, is that "it gives [doctors] an important second opinion," according to Dr. Gerald Schneider, an Arnot-Ogden physician in the intensive care unit (ICU). The ICU, where critically ill patients are treated, requires fast responses on often technical questions, Schneider said. The

See **HELP** page 22

Legal expert sees problems

CHICAGO — Can a computer be sued for medical malpractice?

No, but its programmers and software suppliers could face other legal liabilities, according to Miles Zaremski, chairman of the American Bar Association's Committee on Law and Medicine.

Zaremski, the partner in charge of health care litigation for the Chicago law firm of Forman Lurie Sklar and Simon Ltd., said medical expert systems such as Help could leave their developers and distributors liable to product liability suits if the systems should ever provide information that is erroneous.

Like a faulty thermometer

The situation, he explained, is analogous to that of a faulty thermometer. If an attending physician had every reason to trust the thermometer and it gave false readings that harmed the patient, the doctor or the patient would have grounds to sue, Zaremski explained.

The idea of suing an expert system is a novel one, he added, and the idea has yet to be tested in the courts.

Help's developer, Dr. Homer Warner, however, argued that the system does not practice medicine, but simply acts as a source of information, which the doctor can choose to ignore if he wishes.

"It's not a judge," Warner added.

Inherent potential for errors

Zaremski, though, said medical expert systems have inherent potential for making errors because "there are so many exceptions to the rule. How do you program in those exceptions?"

He argued, too, that such systems could help dehumanize the practice of medicine and cause it to "lack the human touch."

Warner, however, said that errors can also occur in medical reference books and that a patient does not feel dehumanized, because he is not always aware that his doctor is using an expert system.

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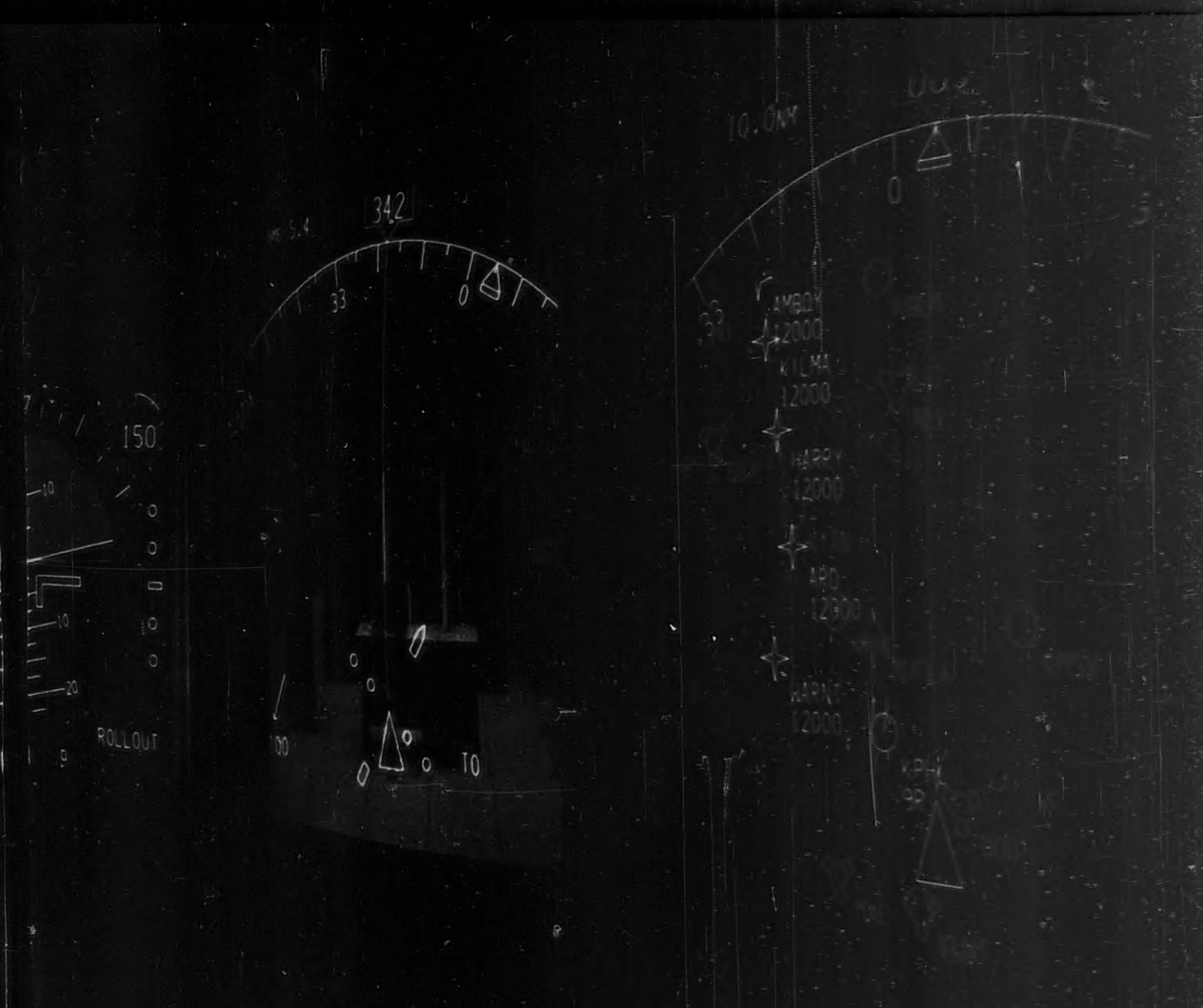
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NEWS

WP salaries increasing, but at slower rate than '83, survey says

WILLOW GROVE, Pa. — Salaries of 14 out of 15 information/word processing job categories showed advances this year, although the rate of increase dropped a bit from 1983, according to a recent survey.

Conducted by the Association of Information Systems Professionals (AISP) during the week of Feb. 17, the

"Tenth Salary Survey Results 1984" is based on reports of AISP members for 15 information and WP-related job categories, including word processors, administrative secretaries, phototypesetters, proofreaders, supervisors and managers.

Thirty-one business groups are reflected in the survey, including manufac-

turing, government, banking and finance, marketing and services.

U.S. figures reflect an overall average salary increase of 5.2% for information/word processing professionals, down from 6% in 1983, based on a study of 20,518 employees in 2,132 companies.

In Canada, responses of

2,370 employees in 259 companies showed an average increase of 6.8%, down from 7.5% last year.

Some U.S. salary increases included: word processing operator, 3.3%, with an average weekly salary of \$275.34; word processing supervisor, 5.1%, with an average weekly salary of \$403.78; information manag-

er, 7%, at \$651.24; word processing manager, 8.2%, with an average salary of \$508.53; and administrative support manager up 8.5% at \$411.14.

The largest salary increase in any job category in Canada was 19% for administrative support supervisor, a job with an average weekly salary of \$487.45. The same job in the U.S. carries a weekly salary of \$411.14.

The "Tenth Salary Survey Results 1984" is available for \$40 to nonmembers and \$25 for AISP members in the U.S. and \$54 and \$30, respectively, in Canada, plus postage.

Send requests to AISP, 1015 N. York Road, Willow Grove, Pa. 19090.

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Exec meet to study micros

CAMBRIDGE, Mass. — Index Systems, Inc. and Hammer and Co., Inc. will present "A Framework for a New Era in Information Systems: Managing Personal Computing," a one-day executive seminar to be held at the Hyatt Regency Hotel here on July 18.

The seminar is the result of a recent multiclient study performed by the two sponsoring companies. It will be conducted by Dr. Michael Hammer, president of Hammer and Co., and Dr. Cyrus Gibson and Gary Gulden, vice-presidents of Index.

The fee for the one-day seminar is \$1,000.

Index Systems is located at Five Cambridge Center, Cambridge, Mass. 02142.

HELP from page 19

Help system provides those answers automatically, at the instant it receives data from tests being conducted on patients throughout the hospital. The attending physician, Schneider said, can then choose to accept or ignore the Help system's recommendations.

Those recommendations are accepted in 80% of all physicians' interactions with the Help system, LDS' Warner reported. Calling it a quality control tool, Warner said the Help system acts "as an adjunct to the physician's own knowledge base."

"Most of the errors we make as physicians," he said, "are errors of omission. Maybe we were tired. Maybe we just didn't notice things."

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tions they're working on, rather than the limitations of the language they're working with.

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guage is *non-procedural*. To define a program, you simply "paint" screens and fill in the blanks. Editing and error handling facilities detect input errors — *automatically*.

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NEWS



**INTERNATIONAL
REPORT**
CIV International
News Network

AUSTRALIA

MELBOURNE — More than 20 different fourth-generation languages were reportedly evaluated before the Australian Wheat Board here selected Adabas from Software AG of North America, Inc. The software is intended to facilitate the implementation of a nationwide IBM network, a spokesman said. The Wheat Board's nine-year-old Honeywell, Inc. Series 64 is being replaced by an IBM 4341 mainframe because of increasing information requirements.

CANBERRA — Datapoint Corp. Pty. Ltd. has beaten the industry leader here, Wang Laboratories, Inc., out of this year's most prestigious office automation contract, signing with the Australian Department of the Prime Minister and Cabinet. The vendor will supply the government leaders with its Arcnet local-area network and its Resource Management System software. Although the contract is valued at only \$1.5 million, sources expect it to have a domino effect throughout the federal government here.

SYDNEY — Olivetti Australia Pty. Ltd. will assume full marketing, support and distribution responsibilities for AT&T's 3B series of minicomputers and Unix System V throughout Australia and New Zealand. The arrangement will be effective Sept. 1, according to a spokesman.

DENMARK

COPENHAGEN — Dansk Data Elektronik has penned a marketing agreement with Thorn-EMI in the UK

that calls for Thorn to sell Dansk's Supermax system in the UK and France. The Supermax, which has been nicknamed the Great Dane, is based on Motorola, Inc.'s 68000 microprocessor and is enjoying much popularity in Denmark and abroad, an insider reported.

COPENHAGEN — The combined efforts of two non-DP industrial groups may rescue Denmark's largest computer and communications company, Christian Rovsing A/S, from impending financial disaster. The Lego Group, makers of Lego wooden building toys, has offered the capital necessary to keep Christian Rovsing afloat, and the Novo Group, a leading manufacturer of pharmaceutical products here, will provide management consulting services. Christian Rovsing has recently suffered losses

of \$7.1 million, which were uncovered by Price Waterhouse & Co. accountants after Christian Rovsing announced its intention to make a public stock offering on the New York Stock Exchange. The DP company's main problem is thought to be an unmanageable annual growth rate of 50% for the past six consecutive years.

FRANCE

PARIS — A spare piece of France's Eiffel Tower will be on display at the National Computer Conference in Las Vegas at Booth C3350, a spokesman here said. The U-beam measures 32 in. long, weighs about 66 lbs and is valued at \$3,500. It was removed from the structure to go on the road during the renovation project begun

on the tower in 1982.

HONG KONG

HONG KONG — Atari, Inc. has declared war on counterfeiters and has obtained a large number of convictions throughout the Asia/Pacific region. W. Thomas Bayha, managing director of Atari International Ltd. here, recently announced that, "although imitation remains the sincerest form of flattery, we are determined to put a stop to counterfeiting, illegal copying and passing-off of copied Atari products whenever we encounter such practices."

JAPAN

TOKYO — Japan's Ministry of In-

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Telecom 84 set for Sept. 11

TORONTO — Canada's role in future telecommunications advances is expected to be discussed at the Canadian Industrial Communications Assembly's (Cica) national conference and trade exhibition — "Telecom 84: Moving With the Information Age" — which is scheduled for Sept. 11-14 at Les Palais des Congres in Montreal.

The scheduled keynote speaker will be Dr. Lester Thurow, professor of economics at MIT and author of *Dangerous Currents: The State of Economics*.

Cica estimates that 150 exhibitors, including 3M Canada, Inc., Northern Telecom, Inc. and Xerox Canada, Inc., will take part in the conference and exposition.

Non-Cica members will be charged \$625 per registration. The first person from a Cica-member company has to pay a \$550 fee, while each additional member will be charged \$500.

Cica is headquartered at Suite 300, 235 Yorkland Blvd., Willowdale, Ont. Canada M2J 4Y8.

NEWS

ternational Trade and Industry (Miti), which has been working on the development of a high-speed, fifth-generation supercomputer, has recently unveiled some of the results of its first two years of research. The six Japanese companies involved in the project are Hitachi Ltd., NEC Corp., Fujitsu Ltd., Toshiba Corp., Mitsubishi Electric Co. Ltd., and OKI Electric Industry Co. Ltd. The project is intended to design a computer that can perform operations at 10G floating-point operations per second. Miti has approached the problem on two levels: One is a parallel data processing approach using many processors composed of multi-instruction stream and multidata stream tape. Another approach to the problem is the development of new large-scale integration circuit technology, made with gallium arsenide and Josephson junction elements.

tion elements.

TOKYO — Fujitsu Ltd. has adopted Open System Interconnection (OSI), becoming the first Japanese computer maker to accept the standards proposed by the International Standards Organization. Other Japanese heavyweights, including Hitachi Ltd. and NEC Corp., are expected to follow Fujitsu's lead. Industry sources here predict that IBM will now be forced to facilitate OSI as well.

NETHERLANDS

AMSTERDAM — The first Dutch Computerland retail store will be opened here this month. The store, which is expected to be one of the biggest Computerlands in the world,

will feature several products in the IBM Personal Computer line, according to a spokesman for the retail chain.

VENRAY — Xerox Computer Services, Inc. has opened a European Data Center here in the south of the Netherlands. The Dutch subsidiary of the U.S. company installed an IBM 3081 mainframe to offer more computer power to its client base here, a spokesman said. The firm offers production control and project management services on a remote basis and sells software and IBM equipment under the terms of a joint marketing agreement.

EINHOVEN — Philips Information Systems, Inc. and Siemens AG are planning a joint research and development project in the field of sub-

micron technology to produce a new generation of memory chips. The West German and Dutch governments are expected to contribute to the funding of the project as well, sources here said.

AMSTERDAM — The Dutch Postal Telephone and Telegraph (PTT) will strongly promote the use of digital devices on its digitized communications networks. Industry sources reported that the PTT is expected to build fiber-optic networks in Amsterdam and Rotterdam for business applications. The PTT has also ordered ground stations at AT&T/Philips for use with its expanding digital networks.

Forum to study banking rules

WASHINGTON, D.C. — The Battelle Memorial Institute and American University have announced plans for a conference on planned federal regulations relating to offshore banking, electronic banking and currency transaction reporting.

Scheduled for Sept. 24-25 on the university campus, the conference is intended for bank and electronic funds transfer officials, security professionals and attorneys representing banks and securities houses.

The focus is expected to be on the regulations' impact on international narcotics trafficking and money laundering.

Scheduled speakers include Assistant Treasury Secretaries Richard Shriver and John Walker and Chief Investigator Charles Morley of the U.S. Senate Permanent Subcommittee on Investigations.

Registration is \$425. Additional information is available from the Office of Continuing Education and Conferences, the American University, 4400 Massachusetts Ave. N.W., Washington, D.C. 20016.

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NEWS


TURNAROUND TIME
 Larry Long

Q I work in the personnel department and specialize in recruiting and hiring people for our 600-person information resources department. Most are hired directly out of college and put through our training program.

Internally, the talk is of fourth-generation languages and the promise of enormous increases in productivity. However, the students that I interview usually have no more than an intermediate knowledge of languages like RPG, Cobol and Basic. Fewer than one in 10 has any knowledge of fourth-generation languages. Why are our col-

leges not offering courses in fourth-generation languages?

I occasionally ask the same question of professors and they cite one or all of the following reasons: First, it is not easy to make a major change to a curriculum that is already packed. Second, they cannot determine which of the many fourth-generation languages should be taught. And third, these languages are too costly for academic computer center budgets.

The first two objections can be overcome internally. The third is going to take some cooperation from hardware and software vendors.

The trend in your organization and just about everywhere else is to use fourth-generation languages more extensively. College and university curricula that do not offer instruction in fourth-generation lan-

guages are falling behind. This is my opinion. I would be interested in hearing from others that agree or disagree with me.

Q At lunch the conversation between myself, two other applications programmers and a systems programmer revolved around the ease with which any one of us could embezzle tens of thousands of dollars from our employer [a bank] and get away with it. We talked of several well-documented electronic scams that would work here.

Surprisingly, each of us was able to suggest ways to pilfer funds from the bank. Most involved simple program modification, but the systems programmer's scheme was more exotic. He suggested ways to intercept and modify certain data transmissions.

This candid conversation made us very sensitive to how vulnerable we are to computer crime. My co-workers agree that something must be done, but top management continues to place a very low priority on implementing security measures. How can we convince them of the potential for disaster and the importance of security safeguards?

A bank that downplays the threat of fraud is essentially playing hockey without a goalie. A hockey coach may reallocate his resources for a short-term gain, but in so doing, he makes his team vulnerable to the quick score.

The move to more and more electronic funds transfer has a multiplier effect on system vulnerability. I am continually amazed that high-level bankers are content to concern themselves with traditional banking matters and defer decisions on data security until something happens.

They must be told emphatically that a computer heist can do much more than clean out the teller drawers. Perhaps you and your colleagues can bring this point home by discussing, and even demonstrating, how vulnerable your bank is to an electronic heist.

Security is implemented in degrees. No organization can be totally secure, but the technology is available to substantially decrease the opportunity for computer crime. I hope your warnings are heeded.

Q I have been teaching computer science courses at a college for two semesters and will probably stay on for one more academic year. I have a bachelor's and master's degree in Business Administration and another master's in MIS.

My goal is to enter the industry and work in an MIS-related environment. What can I do next year besides teaching in order to gain some practical experience?

If your job function is primarily teaching, you should be planning ways to gain practical experience in the context of teaching. Go to local industry and ask for enough material to enable you to assign "live" systems and programming projects. Offer a copy of the best project as incentive to encourage their cooperation.

Volunteer to teach advanced courses and those dealing with new technology. Potential employers will seek these skills, even if you have not applied these skills in industry.

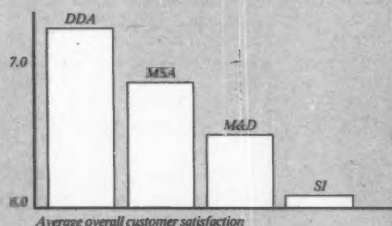
You might consider doing some contract systems and programming work, but you may not have time if you teach several new courses.

Long, president of Long and Associates, is a consultant, lecturer and author in the field of information services. If you have a question you'd like him to address, send it to Larry Long, Editorial Department, Computerworld, P.O. Box 880, Framingham, Mass. 01701.

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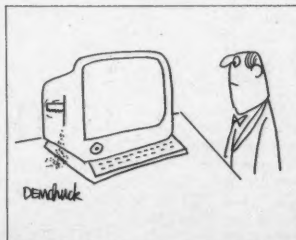
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CWD 3



NEWS

GE engineers build productivity with help from OA

HUDSON FALLS, N.Y. — Office automation at a General Electric Co. department here has boosted the productivity not only of the clerical staff, but also of its engineers, who use the OA system's integrated word and data processing features to design GE capacitors.

"We wanted to find a good office system that would allow us to integrate information processing utilizing a one-terminal-per-desk approach," according to Ray Buhr, manager of information systems for the GE Capacitor Products Department.

Particular OA needs

Buhr said he needed an OA system to help secretaries handle an increasing support load, and at the same time, he needed a system compatible with the MIS staff's plans for a totally integrated information processing network.

This approach led the department to select Honeywell, Inc.'s DPS 6-based office system, which integrates word and data processing in a manner transparent to system users.

Bartlett explained that the department selected the Honeywell office system largely because GE uses Honeywell hardware for data processing. "We are already tied into a large GE regional computer center that uses Honeywell hardware," he said. "The DPS 6 was a natural fit for communication with that

system, and we liked its features."

Bartlett reported that installation problems for the OA system were minimal. "We even connected OA terminals to a plant a mile down the road," he said.

Productivity boost

The OA system has increased productivity noticeably

in the marketing, finance and research departments for such applications as updating product price lists, preparing financial reports, coordinating staff travel plans and preparing research reports, department employees reported.

Bartlett said he is concentrating on applications that

integrate word and data processing.

A prime example is the engineering staff's preparation of decision tables, where engineers can make changes in product designs in a word processing environment. Once the table is completed, it is transferred to a data processing application — using the same terminal — for

Fortran program generation.

Now that the OA system is complete, Bartlett said, he has turned his attention to installing a Honeywell DM 6 transaction processor for inventory control and to the prospect of tying the department's Honeywell terminals and IBM Personal Computers together in a local-area network.

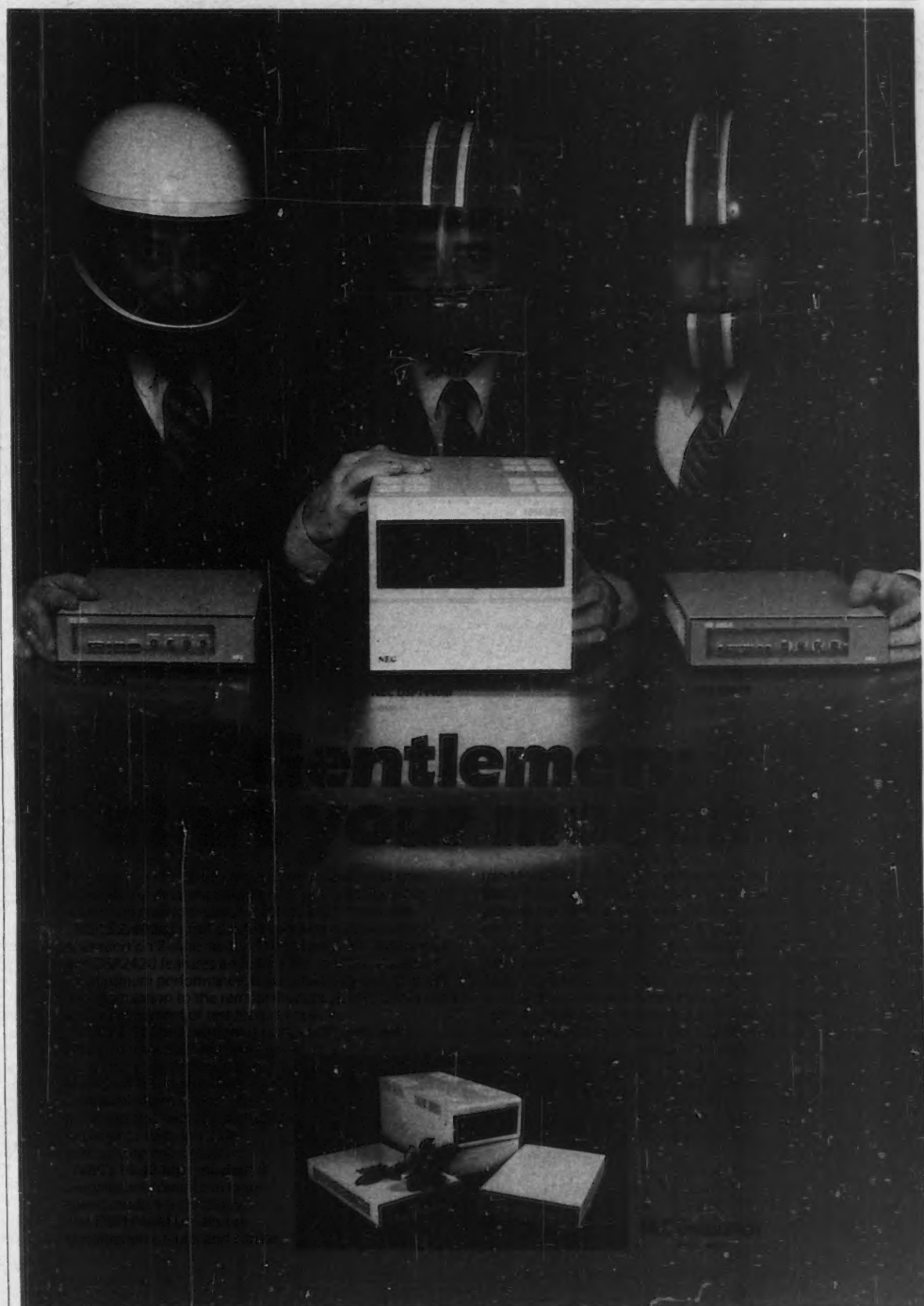
EFT book gets update

WASHINGTON, D.C. — An updated reference book containing information on publications and services of interest to electronic funds transfer (EFT) users was announced here by the EFT Association.

Sources of EFT Information was originally published in 1982 in response to the growth of EFT systems and services and the corresponding growth in the need for up-to-date, accurate information.

For the 1984 version, which reportedly has been greatly expanded, the EFT Association contacted more than 130 organizations in order to gather information.

The price of *Sources of EFT Information* is \$15 for members of the organization and \$25 for nonmembers. Prepaid orders or requests for information should be sent to the EFT Association, Suite 800, 1029 Vermont Ave. N.W., Washington, D.C. 20005.



NEWS

Hartford Insurance achieves premium results with

HARTFORD, Conn. — Sometimes small is better. Like many major corporations, the Hartford Insurance Group had been using a mainframe to generate business graphics. Several leading high-level software systems were acquired for this purpose. The Hartford's Information Management Department provided support with ongoing training for the production of business charts, graphs, maps and other presentation materials. Potential users could enroll in a class at the resource center. When computer-generated graphics could not meet a user's needs, the audio visual department was available for customized, hand-drawn graphics.

In a recent survey by International Data Corp., a Framingham, Mass.-based research firm, 99% of the microcomputer users interviewed said that they intended to add graphics equipment and/or software to their business workstations over the next two years. Not surprisingly, the same study projected a compound growth rate of 47% for the business graphics market. At that rate, the business graphics market will exceed \$1.4 billion in 1986.

Most projections for the business graphics market are equally spectacular, but it is sometimes difficult to see how graphics are actually being implemented in the real world. The Hartford recently began to take advantage of personal-computer-based graphics capability.

Teaching the user

Phil Archambeault, an in-house graphics consultant, was training Hartford personnel on the use of the mainframe graphics systems when he became frustrated with the complexity of teaching the average graphics user.

"I was working with people who needed walk-up service. They wanted to be able to sit down, hit some keys and walk away with an attractive chart," Archambeault said. "The mainframe systems were very powerful, but difficult to learn and use, particularly for the seasonal or occasional user. It was the sheer variety of the people doing graphics that convinced me we needed something easy enough for everyone to use, but capable of producing the quality output we had come to expect."

In addition to the demands of training, the mainframe graphics systems also made excessive demands on computing resources. "Let's face it, graphics is a system hog," Archambeault continued. "Users doing graphics can cut substantially into the re-

sources of the machine available for other applications. There was general agreement within data processing to move the bulk of the graphics load off the host IBM 3083 running VM/CMS."

In 1982, Information Management began looking for alternatives. The staff investigated stand-alone graphics systems, but did not want to

make the substantial investment in specialized hardware that these systems require. The cost factor was the primary reason for not going this route. During the same year, the Hartford began installing IBM Personal Computers. Archambeault and others in Information Management had hoped to find a personal-computer-based

alternative that met their four major criteria — ease of use, flexibility, quality and price.

Their evaluation of microcomputer graphics software revealed that most available graphics packages were designed primarily for analysis, with little or no attention paid to the presentation qualities that the Hartford

required. While at a trade show in New York later that year, Archambeault saw a demonstration of a personal computer graphics package that focused on presentation graphics, not analysis.

"The charts immediately caught my eye, and I took some samples back to my office to show my colleagues," Archambeault said. "These

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instance, we're introducing a new high-speed band printer with changeable type. Operating now with IBM's SNA, we've also added new, low-cost distributed data processing capabilities for more system versatility, and to provide for future growth toward the integrated office.

Match our

personal computer-based business graphics system

were the first graphics from a personal computer that looked as good as [those produced by] the mainframe system we had been using."

Archambeault was also impressed by the production methodology. The package, called Graphwriter, from Graphic Communications, Inc. of Waltham, Mass., consists of 24 format programs.

Instead of learning a command language, the user selects a chart from a catalog of chart types. The user enters text and data, and the program does the rest. A fill-in-the-blanks worksheet can also be used.

Archambeault found that the worksheet is a solution to the pencil-sketched charts from which a user often

works. Once text and data are entered, the elements of the chart can be customized for size, color, orientation and so forth.

The first personal computer/Graphwriter workstation was installed in the central information center at the Hartford headquarters in April 1983. Archambeault saw results immediately.

"For the first time, creating a chart was easy and painless. On any given day, you can see secretaries using the system, as well as a director or vice-president who will show up and want to do his own graphs."

Information Management provides support for Graphwriter by offering a weekly introductory session.

"Some users who come to us have never used a personal computer, so we show them what to do," Archambeault explained. "Once they have gained some basic personal computer familiarity, they are on their own and need much less additional help than with mainframe products. With menus, prompts, and Help screens, there are no commands to learn — or forget."

Some departments were quick to discover new uses for graphics that warranted the purchase of their own system. There are five groups within the Hartford that initially used the personal computer/Graphwriter system in the information center and now have one in their own department. Staff from one group, located at a remote office, was driving 20 miles to do charts before its own system was installed.

User encouragement

Users at the information center are encouraged to use the personal computer for graphics. Some specialized applications — like mapping or charts requiring intensive data retrieval from a special file — are still done on the mainframe, but the major work load shifted from mainframe to micro very quickly. Before the personal computer/Graphwriter system was installed, use of all mainframe graphics systems totalled approximately 550 hours per year. After 11 months of operation, the personal computer graphics system was in operation for more than 750 hours and had spawned five other installations.

Soon after the personal introduced, the Hartford discontinued the use of all mainframe graphics tools that required keyed input (except one with special geographical and mapping capabilities). The discontinued systems ranged in price from \$200 to \$350 per month each. Use of the one remaining mainframe package dropped 25% in spite of the fact that the number of graphics users increased. "We could never have handled this many users with only the mainframe system," Archambeault asserted.

According to Archambeault, the personal computer approach to graphics won Information Management a great deal of visibility and support within the company. He also credited the personal computer-based system with having increased the general awareness of graphics at the Hartford. The company plans to open three (and possibly five) additional information centers at other company locations this year.



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NEWS

Aerospace group enlists micros to track testing gear

Machines enable firm to keep tabs on equipment's whereabouts

BALTIMORE — Microcomputers have greatly improved an avionics and aerospace company's ability to keep track of the 20,000 pieces of electronic gear the firm uses for product testing.

Acquisition of the micros has enabled Westinghouse Corp.'s Aerospace Division to gain immediate access to information about the whereabouts of the company's test equipment for the first time, according to Ronnie Todes, who manages the division's research and development labs.

Valued at millions of dollars, the equipment is in continuous use by the division's 3,000 engineers and is constantly being shuttled from place to place, Todes said. The extreme mobility of the outfit's test gear — which includes units such as oscilloscopes, function generators, spectrum analyzers and network analyzers — presented Westinghouse with a severe challenge.

"When you're in a constantly changing engineering environment, you have to know where your test equipment is at all times," Todes said. "Otherwise, we can't carry on the design, test and diagnostic work that is our main business."

In the beginning

For a time, Westinghouse inventoried and monitored the movements of its electronic test hardware through a batch system running on a Sperry Corp. mainframe. But with the batch system, the division found itself unable to gain ready access to its test-equipment data base or to update the information to reflect recent changes in each unit's status and location. The contents of the data base were thus "ancient history and quickly lost their credibility," Todes recalled.

In an effort to increase the timeliness of the data base and improve its ability to keep track of the test gear, Westinghouse eventually decided to upgrade the inventory system to operate in real time.

At first, the division considered transferring its equipment information from the Sperry mainframe to one of its many other in-house processors, including a wide variety of models from IBM and Hewlett-Packard Co. But the idea was soon abandoned, Todes said, because the existing machines "were usually tied up with other tasks" and because of a shortage of appropriate software.

Changing information needs

"The kind of information we need about our test equipment differs from moment to moment," he said. "Sometimes, we want to find out which units are assigned to a particular engineer. Other times, we need to have information about equipment of a certain type."

But the software that was then available with the division's other in-house processors simply lacked the flexibility and adaptability to meet the organization's ever-shifting information needs, Todes said.

In the end, the division upgraded its equipment-tracking system by attaching a cluster of IBM Personal Computers and Control Data Corp. Model 110 microcomputers to its

Sperry mainframe. Complementing the small machines were CDC's SK2000 and the Micro Information Processing Family software packages.

Two program families

Todes credited the two program families with being "more convenient, adaptable and suitable for our particular kind of application" than the software that was already available with the division's existing IBM and HP processors. The CDC packages "made it very easy for us to enter the type of information we need and manipulate it to get breakdowns

by manufacturer, engineer and equipment category."

The combination of appropriate software and on-line microcomputers now enables the Westinghouse division to gain access to its test-equipment data base in "essentially real time," Todes added. "If we need, say, spectrum analyzers, we can quickly find out how many units of each type we have and who is currently using them."

By examining the contents of its inventory data base, the division can then tell whether it has an adequate supply of each category of test equipment or whether it should buy addi-

tional units to meet increased demand. The micros thus aid the organization in "making management decisions that involve an appreciable amount of money," Todes said.

In the future, Westinghouse intends to expand its equipment data base to include an inventory of the division's integrated circuits and other components, which are used for building engineering prototypes of finished products. The added information will include details like component prices, the number of units of each device class and their current warehouse locations, Todes maintained.

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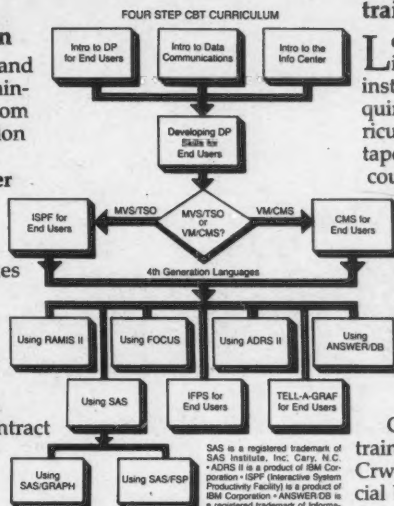
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The New Cincom: 10 the only software ve

Finally, there's one software vendor offering a sophisticated software information network capable of meeting all of your corporate, departmental and personal information software needs—The New Cincom Systems. Organizations around the world are discovering that working with Cincom's integrated family of products enables them to greatly improve both performance and productivity. Here are just 10 of the many reasons why you should be considering the New Cincom software information network for your company:

#1 Relational Data Management Technology

Powerful relational data management technology forms the "nucleus" of our software information network. Using a unique "Logical View" concept, all applications operate directly with "derived relational tables." As a result, we can provide complete data structure independence, as well as the high performance needed for today's production environments. This relational technology is the nucleus of both our TIS™ family of information products for IBM users and our ULTRA INTERACTIVE DATA BASE SYSTEM™ for DEC™ VAX™ users.

#2 Fourth Generation Application Development

The perfect complement to our relational data management technology is our industry acclaimed 4th Generation application development system, MANTIS™. In more than 1,500 complex production environments, MANTIS is dramatically reducing the application backlog through its powerful ability to "prototype," refine and commit the application to production in one interactive sitting.

#3 Manufacturing Control Software

CONTROL: MRPS is our sophisticated manufacturing control system that is fully integrated with our relational data base

You should know how our integrated family of software technologies meets all your information processing needs.

The New Cincom: Integrated Family of Software Technologies

The New Cincom's family of software technologies provides a comprehensive, integrated software information network for your company. It provides a flexible foundation that will adapt to your future information processing needs.

- Relational Data Management
- Application Development
- Business Control Applications
- Decision Support • Network Management

The foundation of our product line is the Nucleus relational data management system. It provides a logical view of data that insulates users, accessing and navigation strategies, and physical environ-

ment. CRICKET™ is our MANTIS to the IBM PC XT 320 environment. It provides the same powerful



development tools as MANTIS for your personal computer. And when combined with PC CONTACT™, you can use CRICKET to interact directly with the mainframe.

Business Control Applications

Also integrated with our data base technology and designed for use in both IBM and DEC VAX environments is CONTROL: MRPS™ and CONTROL: FACS™. MRPS is our industry proven manufacturing and inventory control system that's guaranteed to dramatically improve your company's production and profitability. CONTROL: FACS is our outstanding new financial management package, written in MANTIS, and completely integrated with MRPS.

Decision Support

A high priority to our needs management solutions for the level of needs of end-users in both the mainframe and micro environments. To meet the needs of organizations in which end-users interact to a terminal mainframe environment, we offer the MANAGE USER SERIES™. Using the power and the accessibility of the mainframe, the graphics, spreadsheet, text processing, and 4th Generation application development capabilities provide PC-like capability while ensuring DP control.

For the end user in a micro environment we offer Series OnePlus™, our comprehensive package of integrated programs that satisfies a variety of end-user information handling

The New Cincom: Excellence In Software Technology

The balance of this brochure provides a more detailed overview of our five integrated software technologies. Look closely at what Cincom Systems has to offer. We believe that our new product line (every product either begun or completed in the 1980s) provides the highest degree of reliability, integration, and performance in the industry.

When you see for yourself what the New Cincom Systems is all about, you'll understand why the words "Excellence In Software Technology" fit so well under our name.

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technology. A complete closed-loop system, MRPS is improving the productivity and profitability of over 125 IBM and DEC VAX manufacturing environments around the world.

#4 Financial Control Software

CONTROL: Financial is our sophisticated financial accounting and control system which molds to the way you do business. Integrated directly with MRPS, **CONTROL:** Financial includes Accounts Receivable and Credit Management systems with Accounts Payable soon to follow.

#5 Advanced Network Management

NET/MASTER™ is one of the most recent additions to the New Cincom family of integrated products. Very simply, **NET/MASTER** is an advanced network management system that takes the complexity out of managing a sophisticated IBM computer network and lays the groundwork for distributed data base processing.

#6 The Interactive Mainframe—Micro Link

Further expanding the capabilities of our software information network is **PC CONTACT**, our mainframe-micro link which enables users to interactively upload/download data between the mainframe and IBM PC's. **PC CONTACT** gives the PC user the ability to access multiple file types stored in the corporate data base for Decision Support manipulation.

#7 Micro Decision Support Software

For comprehensive micro-level Decision Support we offer **SeriesOnePlus™**. **SeriesOnePlus** includes file management, spreadsheet, graphics, reporting and word processing components that are all integrated through a unique "BUS" architecture. Because the system is designed exclusively for business situations, **SeriesOnePlus** complements any mainframe-micro network strategy.

#8 Mainframe Decision Support Software

The recently introduced **MANAGE USER SERIES™** provides powerful Decision Support capabilities for the mainframe user. The **MANAGE USER SERIES** combines graphics, spreadsheet, text processing and application development tools to enhance the use and display of corporate data.

#9 Client Support

The one thing that isn't new about Cincom is our unrivaled commitment to service, support and user education. When you choose Cincom you can be assured of the highest caliber of support.

#10 Software Excellence

Why the New Cincom? Well, we like to think of ourselves as the New Cincom because every product in our software information network has been released since 1981. And, quite frankly, we

believe our new products provide the highest degree of reliability, integration, performance and value in the industry. As proof, just look at our sales. From 1982 to 1983, **TIS** sales rose 136%, **MANTIS** sales rose 50%, and **MRPS** sales rose by 45%. For even more proof we invite you to personally compare our products with what our competitors are offering. Then you'll understand why the words "Excellence In Software Technology" fit so well under our name.



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NEWS

Bank's service firm cuts costs with communications link

LITTLE ROCK, Ark. — After finding that a private network based on leased lines was unreliable and too costly, a bank's consumer services subsidiary began a search for a new means to link six regional processing centers to a central processing facility here.

Chase U.S. Consumer Services, Inc., a subsidiary of Chase Manhattan Corp., runs its financial accounting for 18 offices from a central processing center here with input from regional centers in Dallas, San Diego, Denver, New York, Phoenix and Margate, Fla.

Each month, the regional centers each process and transmit to Little Rock between 15 million and 45 million characters of data about the company's lending services — lines of credit, installment loans, deposits on savings, certificates of deposit — for professionals and small businesses that meet selective income and property-value requirements.

"We began our network with landlines because it was the technology with which we were most familiar, and we were eager to get our network started. However, we began collecting information on other networks and formulated a procedure for testing each one," said Norman Greisen, vice-president for systems with the three-year-old firm.

"Cost was certainly the most important factor, but we were also concerned with network reliability and the level of support each company supplied. We have a small

staff and could not afford to expend the time of one person to continually monitor the network for problems, not to mention the cost of purchasing and maintaining our own diagnostic equipment. We wanted a network that took full responsibility for network reliability," he added.

The company also wanted a network that would accommodate the IBM 3270 bi-synchronous protocol of its mainframe, an IBM 3083 run

"We were also concerned with network reliability and the level of support . . ."

— Norman Greisen, vice-president for systems Chase U.S. Consumer Services, Inc.

by Systematics, Inc., a service bureau here. Chase U.S. examined options such as leased landlines for point-to-point communications, multi-point lines, public packet-switching networks and the RCA Cylix Communications Network, Inc. value-added, satellite network.

Greisen said studies showed the average yearly cost of point-to-point communication lines was more than double the cost of RCA Cylix's satellite network. Chase U.S. began a field test of RCA Cylix at their Dallas processing center.

"We wanted to see how

the system would function over an extended period of time under the heavy use we would give it. More important, we wanted to see how long it took RCA Cylix to perform error detection and retransmission," said Eugene Bellido, second vice-president of systems.

Bellido said a benchmark study showed virtually no difference in response time between line and satellite transmission at 2,400 bit/sec. At 9,600 bit/sec., the difference was four seconds, which RCA Cylix technicians reduced to two seconds through software changes, Bellido said.

Since that 1982 test, the remaining processing centers were added to the network. In addition, Chase U.S. has begun testing RCA Cylix's dial-backup system, announced last month.

Bellido noted that the satellite network scored highest in the areas of cost-effectiveness, network reliability and support.

He said RCA Cylix provides "end-to-end" network management, including protocol conversion, data concentration, end-to-end diagnostics and error correction.

"We felt that if we could find a network alternative that minimized transmission errors, we would save time and money . . . and we have. When one of our branches has a transmission problem, RCA Cylix customer service representatives are usually right on the job working to diagnose and solve it. If the service breakdown is found in the user's local phone lines, RCA Cylix works with the phone company in that area to solve the problem," he said.

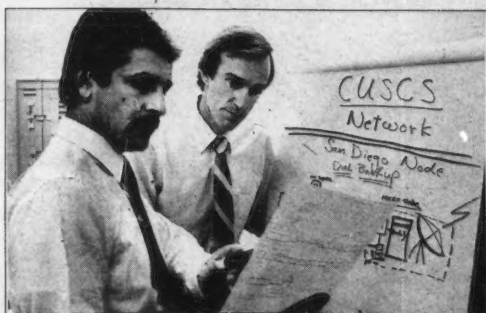
"I've been to RCA Cylix's main facility in Memphis, and their diagnostic equipment is very impressive.

"It would cost us a small fortune if we had to set up a similar control center and assign a full-time communications specialist to monitor the network," Bellido reported.

While the RCA Cylix network was built for transaction-oriented applications, Chase U.S. uses the network most efficiently by doing the bulk of its processing during off-peak hours when the usage rates are lowest.

During regular business hours, the 18 branches send transaction data to the regional centers using NEC Corp. System Nefax facsimile machines.

The regional centers, which use AT&T Dataspeed 4540 terminal and printer systems for input, are linked by dedicated lines to the RCA Cylix network's micro-nodes.



Discussing strategy at Chase U.S. Consumer Services, Inc.

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NEWS

EDP auditors elect new officers

ATLANTA — John W. Lainhart IV was elected president of the EDP Auditors Association and the EDP Auditors Foundation at the international conference of those organizations held here in June.

Lainhart is a career government auditor who is presently director of Office of Automatic Data Processing Audits and Technical Support in the Office of the Inspector General, U.S. Department of Transportation.

Other newly elected officers of the association and foundation are Michael P. Cangemi of Phelps Dodge Corp. in New York, executive vice-president; Robert Parker of Deloitte, Haskins and Sells Corp. in Toronto, administrative vice-president; and K. Wayne Snipes Jr. of Enserch Corp. in Dallas, secretary.

Treasurer of the association is now John H. Minta of Liberty National Bank and Trust, Louisville, Ky.

Unix Expo slated for New York

NEW YORK — The Unix Operating System Exposition & Conference (Unix Expo), an exposition and conference aimed at increasing the involvement of business and computer communities in the New York metropolitan area with the Unix operating system, will be held here Oct. 16-18. The exposition will take place at the Marina Expo Complex, and the conference will be at the Sheraton Centre Hotel.

Registration fees are as follows: \$5 advance registration for the exhibition only (\$10 at the door); \$150 in advance for half-day program seminars (\$175 on-site); \$250 in advance for full-day program seminars (\$295 on-site).

More information on the conference is available from Robert P. Birkfeld, President, National Expositions Co., 14 W. 40th St., New York, N.Y. 10018.

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NEWS

Statistical package helps Quaker Oats plan strategy

CHICAGO — Do American consumers think Chewy Granola Bars are chewy enough? That is the kind of question that receives considerable study by market researchers here at Quaker Oats Co., the huge food-products firm that makes the food bars, and they get help from statistical analysis software.

The software, on a Burroughs Corp. B7900 mainframe, enables Quaker Oats researchers to analyze questionnaires, surveys and laboratory tests on consumer tastes and preferences, according to company officials.

"We use most of the general statistical routines," said Jacqueline Pearce, manager of sensory evaluation at Quaker Oats' research laboratories. "I'm issuing questionnaires all the time and getting responses from 800 people a week on an average of three products per study. That's 24,000 judgments a week, and each questionnaire has about 20 questions. It adds up to a lot of data," she said.

The software she uses is the SPSS Information Analysis System from SPSS, Inc. of Chicago. "SPSS has all the necessary procedures that you really need to do any

type of statistical analysis with," according to Frank Hemmige, manager of the computer information center at Quaker Oats.

The SPSS software was selected about four years ago, Hemmige said. He said that SPSS had ample analysis features, clear documentation and the bonus that some members of the research de-

partment were already familiar with SPSS from academic work.

Other applications for the statistical software at Quaker Oats include:

- The Quaker Oats personnel department uses SPSS to generate reports on worker productivity and to make long-term personnel projections.

- Researchers use SPSS to develop time-series models to forecast grocery inventories, which have improved customer service and reduced the capital tied up in excess inventories.

At the information center, Hemmige counsels users on the use of SPSS and statistics because conclusions must be carefully drawn in statistical

analysis. "It's important to understand that you can come to dangerous conclusions" if SPSS statistical routines are applied improperly, he said.

With the growing use of microcomputers at Quaker Oats, Hemmige predicts that users will want a host of small statistical applications for micros.

Net seminar scheduled for Sept. 24

WASHINGTON, D.C. — Telestrategies, Inc. will hold a seminar, titled "Digital Networking Technologies, Economics and Opportunities," at the Stoufferts Concourse Hotel here Sept. 24-25.

The seminar's audience will include large corporate users, interexchange carriers, investors, manufacturers and entrepreneurs, according to its sponsor. The instructor will be Dr. Jerome G. Lucas, founder of Telestrategies.

The seminar will explore what the divested Bell operating companies are offering in the digital services marketplace; what services are tariffed; prices, regulatory constraints and access charge considerations; digital bypass alternatives; how operating companies' digital services compare with bypass alternatives; and what new end-user equipment is available.

The registration fee for the seminar is \$895.

Further information can be obtained from Telestrategies through P.O. Box 1218, McLean, Va. 22101.



NEWS

System ties mortgage firm's remote sites to home office

MINNEAPOLIS — The nation's second-largest mortgage company found it needed the ability to provide branch offices and banks throughout the U.S. with up-to-date interest rates and other details about mortgage plans.

Norwest Mortgage, Inc. needed to give bank loan officers access to a quote line

and mortgage plan outlines and to provide the ability to calculate annual percentage rates once a home buyer selected a plan, said Michael B. Kern, Norwest's assistant vice-president of communications services.

The Minneapolis-based subsidiary of Norwest Corp., Norwest Mortgage currently services about \$13 billion in

mortgages. The firm needed a system that allowed users access to its mortgage information through a wide variety of personal computers, minicomputers and mainframe systems and modems.

Norwest is now in the process of giving its 75 branch offices and about 500 banks with which it does business access to the necessary data

and processing capabilities on AT&T Information System, Inc.'s Net 1000, a shared, distributed and intelligent network.

"Working closely with AT&T Information Systems personnel was the key ingredient to bringing a much-needed enhanced service online quickly."

"Net 1000 allows us to

bring a remote branch up to corporate technological speed literally overnight without major capital expenditures, personnel moves or lengthy training cycles," Kern said.

Each day, Norwest officials use an IBM 4381 mainframe to compile interest rates and other details and send them by dial up to Net 1000.

As the day progresses, Norwest's branch office workers and correspondent agents in banks dial into Net 1000 through local telephone numbers. Each user keys in a logon to gain access to the Norwest applications that reside on the Net 1000 computers.

Those applications at present are the rate quote line and the annual percentage rate worksheet, but, Kern said, the company envisions adding other applications in the future.

Norwest is steadily shifting its users to Net 1000, in some cases taking users off more expensive leased lines. Kern said about 40 of 75 branch offices now use Net 1000, while 15 others use leased lines.

Kern said banks may take longer, but within a year or two, the number of banks using Norwest's Net 1000 link may rise from the current dozen to about 500.

SIM creates foundation

CHICAGO — The Society for Information Management (SIM) has established a new foundation to advance research and education in information management and systems.

Called the SIM Educational Foundation, the new organization is governed by a five-person board of trustees.

Primarily funded by companies already active in SIM, it will serve as a catalyst for research and new educational programs.

The SIM Educational Foundation is based at 111 E. Wacker Drive, Chicago, Ill. 60601.

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The clean, crisp display features a large character matrix on an easy-to-read green or amber non-glare screen—made even easier to read by the hooded bezel. Screens are available in 12" or 14" sizes.

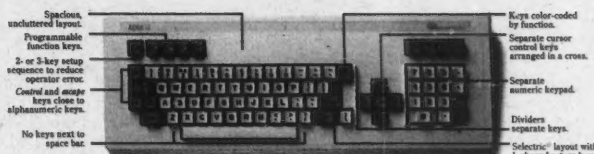
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NEWS

Oil firm uses bisynch-based controllers to link CPUs

HOUSTON — Three years ago, Tenneco Oil Exploration and Production Co. here had a problem: how to make data accessible from four different makes of mainframe computers located in three buildings up to 10 miles apart, without placing two or more CRT terminals on each user's desk.

Tenneco found that the

common denominator among its IBM, Amdahl Corp., Control Data Corp. and Honeywell, Inc. mainframes was the bisynchronous 3270 protocol and Braegen Corp. controller/terminal systems.

"Over a five-year period, we are migrating to exclusive reliance on IBM mainframes," explained Kenny Anderson, Tenneco's manag-

er of system support. "But until then, we need to keep using all of the existing equipment."

The present system uses seven Braegen B40 controllers to interconnect more than 100 Braegen display stations and printers with the four mainframes. The links are composed of coaxial cable. Devices can be placed

up to 7,000 feet away from any B40. Up to 32 Braegen B6 display stations can be linked to a single B40 on as few as four coaxial cables.

To connect its downtown Houston headquarters with the other two buildings, Tenneco uses Braegen's Channel Interface Extension (CIX) — a four-wire, full-duplex line protocol that allows multiple

B40 controllers and B6 terminals to be placed at remote sites while appearing as local units to the host computer.

CIX modems support standard communications and local and remote loopback diagnostics at line speeds of 9,600 or 19.2K bit/sec. In addition, CIX may be used over satellite-based communications links.

One benefit of installing CIX, Anderson said, is that it has eliminated the use of "multiple technologies and lines." In addition, by minimizing the need for receiver acknowledgment, it has increased message throughput.

Another feature of the system, Anderson said, is that all communications control resides in the Braegen controller rather than in the CRT terminal or the host front end. "This means that I can access and submit data to one of our four mainframes, and then with one keystroke begin a session with any of the other mainframes. Actually, the system allows a terminal to communicate with all four mainframes concurrently."

User transparency was important for Tenneco because data needed by individual users frequently is stored in more than one of the four computers. Tenneco's applications include economic modeling, payroll, accounts payable and development applications for its worldwide operations.

The Braegen equipment was installed in August 1981 and was on-line within 30 days, he added. Anderson also reported that users had few problems because the B6 message symbols and key-boards are similar to IBM's 3277 and 3278 terminals.

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Satellite meet slated for Nov. 12

WASHINGTON, D.C. — Telestrategies, Inc. will sponsor a seminar on "Satellite Communications" at the Sheraton Crystal City Hotel here from Nov. 12-13.

The instructor will be Dr. Jerome G. Lucas, founder of Telestrategies, who has technical experience in satellite communications, digital transmission, voice/data switching systems, image processing and optical fiber implementation.

The registration fee for the two-day event is \$895. More information is available from Telestrategies through P.O. Box 1218, McLean, Va. 22101.

NEWS

Vet clinic's computer system makes service a science

LOS ANGELES — With 17 doctors and more than 70 people on the support staff, the West Los Angeles Veterinary Medical Group, one of the nation's largest animal hospitals, was starting to feel the bite from a lack of automated information processing.

Faced with a sizable backlog of paperwork, including client reminders, invoices and accounts payables, Richard Gebhart, president of the clinic, embarked on a search for a computer system that could meet his clinic's growing business needs.

However, finding a complete computer package designed to fit the special requirements of veterinarians proved to be more difficult than expected. "We only had a few choices open to us. The veterinary business depends on large volumes and low costs, and so we needed a multiuser, on-line, time-sharing system," Gebhart said.

After looking at various micro-computer vendors, Gebhart decided on Alpha Micro, Inc.'s AM 1072 system. "When we looked at other systems, they were not as powerful or did not have the time-sharing capabilities we were looking for. The Alpha Micro product was a fast system

contended.

Unable to find the right software system, Gebhart worked with two software engineers for three years designing an entire veterinary computer management package. Gebhart said the system is capable of carrying out all in-hospital functions, including cashing, client recall, management reports and receptionist functions.

"It was important to us that we design a system that could run on our existing Alpha Micro because we didn't want to have to go out and purchase a new system every time we expanded. We also didn't want to hire an entire staff of computer operators, so we needed hardware and

software that could be menu-driven and which were turnkey systems," Gebhart commented.

Having first installed the Alpha Micro system in 1979, the next four years were spent making it more user friendly for the clinic's support staff.

"We lived the problems," Gebhart recalled. "The major difficulty was, and still is, defining exactly what problem is facing us. If you can fully understand the problem, you are much better able to develop the appropriate software," he said.

Despite the hurdles, Gebhart felt the effort has been well worthwhile. Since the computer system was installed, he said, the client count has doubled from 15,000 to 30,000, and

the number of veterinarians has increased from 10 to 17. Gross income rose from \$1.2 million to \$3 million over that four-year time period, he added.

"We carry out 50,000 transactions a year. There is no way we could have done that without computerization; it has enabled us to automate our services and attract customers more readily," he asserted.

Future enhancements planned for the system include the design of a complete hospital management package to allow each department in the clinic to carry out transactions with all other departments and the installation of a data base management system.

'It was important to us that we design a system that could run on our existing Alpha Micro because we didn't want to have to... purchase a new system every time we expanded. We also didn't want to hire an entire staff' —

Richard Gebhart, clinic president

in the price range we needed," Gebhart explained.

The AM 1072 installed at West Los Angeles is a 32-bit machine with 70M bytes of memory running under Alpha Micro's proprietary operating system. Linked to 18 terminals and eight printers, it has the capability to automate many of the clinic's functions, Gebhart claimed.

However, hardware was only half the battle, as Gebhart and his colleagues soon discovered. "There simply wasn't any software specifically for veterinarians available," Gebhart

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NEWS

Self-service terminal gets skiers on slopes faster

MAMMOTH LAKES, Calif. — On the day after Christmas 1983 at the popular Mammoth Mountain Ski Resort here, there were two lines for lift tickets. In one line, patrons waited 1½ hours for tickets; in the other, the wait was 45 minutes. At the end of the quicker line, a computer terminal was dispensing tickets. At the end of the slow line was a human being.

It was not simply that the machine performed faster than the human; there were fewer patrons waiting in line to use the terminal, an NCR Corp. 1810 self-service terminal, which accepts only credit cards.

Installed in February 1983, the 1810 dispensed 45,350 lift tickets in the 1983-84 season, only 4% of the total number of skiers at Mammoth. "We haven't really promoted it much," said Rasma Thomas, data processing manager for the resort. Promotion may step up next year, since Mammoth plans to add an additional 1810 and connect both machines to a credit card authorization bureau.

Twenty minutes vs. five minutes

On a normal weekend, skiers average a 20-minute wait at the lift ticket window and a 5-minute wait at the 1810, Thomas said.

The terminal's video display welcomes the skier and begins a simple

step-by-step procedure. The terminal reads the magnetic strip on the credit card and displays the customer's name. The customer uses keys on either side of the screen to enter the number and types of tickets desired. The tickets emerge from a slot. A transaction at the terminal can take as few as 20 seconds.

As a security measure, the terminals are programmed to accept only one transaction per card per day. Cards reported lost or stolen are not accepted. Another security feature is that the terminal's memory is immune to power failure. When linked to the credit bureau, the terminals will set a limit on the amount to be charged.

Second self-service terminal

The 1810 was actually the second self-service terminal tried by Mammoth. The first terminal used required reprogramming by the manufacturer's staff whenever a change was needed. Changes on the 1810, programmed in Basic, can be made by Mammoth's own programmers, Thomas said.

The Mammoth Mountain resort, which has 100 ski runs on 3,200 acres, operates an NCR 9300 32-bit minicomputer and an array of terminals for applications ranging from maintenance scheduling, to inven-



Mammoth Mountain Ski Resort's express ticket terminal allows skiers to avoid long lines by using an appropriate credit card to write their own lift tickets.

tory control at stores, to sales analysis, to scheduling for the ski school. When the credit bureau link is made, the 1810s will be processed through the NCR 9300, Thomas said.

The annual number of skiers varies from 1 million to 1.4 million at Mammoth. The 1810 terminals, located adjacent to conventional ticket booths, are intended to reduce peak pressures.

Beyond convenience for skiers, the terminals save the resort in payroll for ticket sellers. But Thomas does not intend to replace all the ticket sellers with terminals. "You need people to handle cash transactions and to answer questions, and some people will always want to deal with

individuals when they buy tickets," she said.

Mammoth found the 1810 to be reliable; the terminals have not been affected by limited exposure to temperatures of 30 degrees Fahrenheit or by ski equipment propped up against them. Some problems have been caused by ticket stock which, if not made to specification or properly encoded, would occasionally jam.

The bottom line for Mammoth is the fact that the 1810 is an effective means of handling long ticket lines. "People come here to have a good time, not to stand in line. Anything we can do to get skiers out on the slopes faster has to be good for business," Thomas said.

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NEWS

Computer graphics aid research on material stress

PALO ALTO, Calif. — Just as the microscope enables scientists to see the minute building blocks of the natural world, computer graphics enables researchers to see complex data in pictorial form. By presenting information as models, charts and drawings rather than as numerical tables and equations, experimental information can be visualized and understood easily.

As a means of visualizing complicated photomechanical experiments, Lockheed Missile & Space Co. developed a computer graphics system to study the effects of stress and strain on materials used in its aviation, aerospace and defense products.

Aiding these efforts is a Digital Equipment Corp. VT100 terminal equipped with a VT640 Retro-Graphics terminal enhancement manufactured by Digital Engineering, Inc. of Sacramento, Calif. The VT640, a printed-circuit card and tube assembly, adds Tektronix, Inc.'s 4010 series graphics-terminal emulation and Tek-based software compatibility to the DEC display.

Lockheed Missile & Space Co., a division of the \$6.2 billion Lockheed Corp. is involved in the research, development and manufacture of products for defense-related programs.

The division, and more specifically the photomechanics laboratory, is currently under government and private-sector contracts to perform experimental stress and strain analysis on metals, composite materials, adhesives and solid propellants in order to understand better

the interfacing of these materials. A good measure of the lab's work is basic research into areas where the goal is an improved understanding of the mechanical properties of new and unusual materials.

Lockheed's primary photomechanics focus is to use optical methods (holography, moiré and photoelasticity) to study the effects of stress and strain on materials and components. Stress can be explained as force distributed over an area; bending, shearing and compression are the results of stress forces. Strain is a ratio of the change in the length of a defined section of material. A pulling force is a common example of stress force. The application of a load (pulling or stretch stress) causes a material to spread out in certain areas by minute amounts. Elasticity is the ability of a material to recover its normal configuration as deforming forces — stresses and strains — are removed.

In the photomechanics laboratory, these elements are studied experimentally by subjecting materials and components to typical stress forces and measuring the material's response through the use of optical techniques. For example, a section of laminated material may be put in a special apparatus capable of exerting a measured amount of pulling force on the adhesives binding the laminated sections. Such an



Using a special video system, an image is digitized.

experiment would evaluate the response parameters of the adhesive. During the loading procedure, the surface responses of the material — whether it be adhesive, metal or plastic — are recorded photographically.

Lockheed's photomechanics lab uses both laser holographic and other optical interferometric methods to record the material's response. Each of these methods, which use light of a known wavelength as a reference point, yield precise measurements of the material's surface response. Once analyzed, these surface responses reveal areas where mechanical failures could occur.

According to A.R. Hunter, a staff scientist at Lockheed,

photographs of optical interference patterns are similar to contour maps in both appearance and function. The images look like a series of black-and-white (or light-and-dark) stripes of various thicknesses radiating from the stressed areas. The stripes, or fringes, indicate the material's surface response.

"In years past, we would manually extract information from these fringes, use the results to calculate the surface response at a few points and plot our findings by hand," Hunter said. "Once this plotting was complete, a bit of mathematical calculation would yield a general view of the areas most likely to encounter faults or failure."

"This manual analysis was quite time-consuming. Due to the slow and tedious nature of this method, we were only able to get a general picture of the material's behavior. This approach did not allow the detail that was needed. As our research deals with minute details,

such as the interface between a section of metal and an adhesive, the manual analysis methods proved to be a considerable shortcoming.

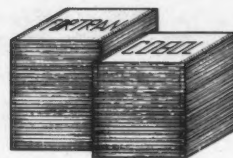
"While there is no question that computer analysis has increased laboratory productivity by speeding mathematical computations," Hunter said, "the primary benefit to our work here is the increased detail with which we can examine materials. In the past, manual analysis would yield information at a few preselected points, not whole field-detailed information as we do now."

Once a material specimen has been subjected to stress or strain, the effects are recorded photographically, and the computer analysis begins.

With a special video data acquisition system, the photographic image is digitized; that is, a numerical value is assigned to each point on the image. (These points refer to the light or dark areas constituting the fringe patterns.)

The numeric values are then transferred electronically to a DEC VAX-11/780 for analysis.

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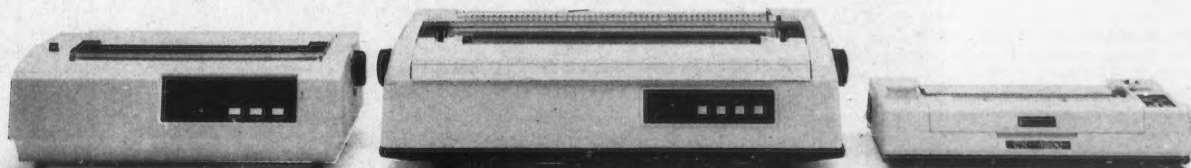
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NEWS

Glassworks finds software thrifty substitute in testing

CORNING, N.Y. — Corning Glass Works had a new telecommunications product to test that required massive measurements, new test instrument systems and the erection of a lead-lined test room. Instead, Dr. Joyce Geier, senior product engineer in the Optical Waveguide Product Engineering Department, discovered that she could use a software package already resident on Corning's system to do all the testing she needed and save the company several million dollars.

"Overall, the application of [SAS software from SAS Institute, Inc.] to our testing problems has helped provide tangible benefits: time, dollars and a high-performance product for consumers," Geier said. At least six months of product testing were eliminated, and money for the new test room and special equipment did not have to be spent. According to Geier, customers are also pleased because she can show them the product's specifications and proof of its functionality.

Testing new products had become a tug-of-war between two important issues at Corning: the need to guarantee high performance to the consumer and the need to introduce the product as quickly as possible to ensure marketplace viability and to capitalize on the uniqueness of the product.

The new testing procedures can simulate up to 10,000 optical waveguide systems in one pass, analyze the results and output them in usable form. (Optical waveguides are hair-thin glass fibers that are replacing copper wire in the communications industry). This cuts through the need to test as many samples from the new product line before its introduction, yet guarantees the performance to the consumer.

Geier's options when looking for a new test system were limited. She could do her own programming, use what was already available at Corning or go with traditional procedures that took many months and much construction to effect. The base SAS Release 82.3 was already being used in testing to analyze experimental data and to set specifications for new fibers. It looked the most promising, and after ascertaining that it could do what she wanted, she had only one problem with it. The array size was limited, so she modified the way she used the base SAS by eliminating arrays she had finished with.

The success of Geier's work proved to be only a first stage; the entire department is now using the base

SAS to characterize products' parameters. Engineers in the Optical Waveguide Product Engineering Department are responsible for new product functionality and reliability. They use computer-based simulation to aid in testing new products and needed a language that was simple, nontechnical and fast. Since they are not

DFers, they needed a language that not only could be adapted to their particular requirements, but which also could solve their testing problems.

"The SAS language was very easy for the product engineers to pick up, and it helped resolve many of the conflicts we were facing between new product reliabil-

ity and market demands," Geier said. "By allowing the owner of a project, such as the product or marketing engineer, to do the actual analysis, we kept the responsibility for the product performance specifications within one group. This gave us the advantage of following a product from start to finish."

Engineers use the base SAS product to extract testing information from limited experimental data. They predict relationships between the new product's characteristics and its performance and focus their attention on only the key product characteristics. Limited additional testing can then prove or disprove the relationships.

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NEWS

Firm cuts costs with decentralized planning system

SALT LAKE CITY — An international manufacturer of waste treatment equipment and industrial filters claims to have decreased its costs by \$500,000 annually and reduced the staff of its data processing department from 20 persons to one person by introducing a manufacturing resource planning system that decentralized its

MIS function.

Bill Dunn, who spearheaded the introduction of the system for his firm, Eimco, also noted that it has reduced Eimco's inventory by almost 25%.

Perhaps most important, Dunn said, the firm's decentralized system better fits Eimco's corporate role as a build-to-order business with

highly customized products.

Eimco, whose sales last year totaled \$72 million, serves a variety of industries — minerals processing, chemicals and food products — and provides treatment equipment for municipalities. The company manufactures heavy-duty filtration systems, pumps, sludge stabilization and digestion

equipment and other waste treatment products. Eighty percent of the business is built to order (six months to ship) with only 20% to 25% standard parts. The company has its main production facilities here, with additional plants in Canada and Mexico, joint ventures in Mexico, Japan and Europe and several licensees.

For the small firm, Dunn said, "The megabase is gone," as users have moved to decentralized systems that give them "the ability to do the job when they want it." That, Dunn said, is just what Eimco's dual material requirements planning (MRP) system provides, with one computer in the hands of the firm's materials manager and another in the hands of its financial manager.

The two minicomputers, Qantel System 40s from MDS Qantel, Inc., communicate to share information from their data bases via a Qantel Best Net and can download data to their respective department's fleet of IBM Personal Computers.

The machines replace a dual IBM 370-based system and have redefined the role of the data processing manager from someone who controls a central data base to someone who provides advice on a roving basis to users, Dunn said.

Payback on the system, Dunn noted, came in under a year.

Eimco, Dunn explained, served as the beta test site for both the Best Net product and the two software packages running on the decentralized system. That software includes a financial package of payroll and accounting applications for the finance department and the Qantel QMRP system in use on the firm's manufacturing side.

Dunn said the Qantel system was brought up in one year, after Eimco finished six months of investigating the products that could meet its decentralized MIS needs. Eimco, Dunn said, "Went down through them all and screened them all very quickly." It settled on Qantel because of the system's modularity, its flexibility and its customer base.

The Qantel System 40 is a multiuser, 64-bit, dual-intelligence transaction processing system that can support up to 64 on-line, interactive terminals and over 900M bytes of on-line disk storage.

The system, Dunn noted, offers the ability for each department to close off financial and manufacturing cycles at will, rather than following a restrictive timetable. This gives Eimco the flexibility to adapt to rapidly changing money supply and market forces, he said.

By locating terminals in each department, under the control of each department head, a layer of bureaucratic structure is eliminated, Dunn said, and interdepartmental friction is eased, as are delays due to the volume of processing. Power and responsibility are now located at the local manager's level.

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NEWS

Graphics system keeps shipyard current on boat repairs

VALLEJO, Calif. — Mare Island Naval Shipyard overhauls and repairs naval vessels of all shapes and sizes. With numerous long-term projects in the various stages of completion, Mare Island shipyard is a busy and complex installation where 10,000 engineers, welders, designers and technicians work on exposed hulls lodged

in immense dry docks.

Projects can easily run for well over a year. It is vitally important to track each project carefully to ensure that completion dates are met. Otherwise, ships still at sea cannot be refitted on schedule.

Recently, shipyard management added computer graphics-generated manpower

loading charts to data management software to track project progress against projected key events in schedules.

Depending on the type of ship and the extent of the work needed, 30 to 50 line graphs, called manpower loading charts, are required for a project.

Figures for each chart

show the actual vs. the projected number of men and man-days, plotted against the month from project start to finish. Before installing Info-Versagraph from Henco Software, Inc. on a Prime Computer, Inc. Prime 750 computer with 6M bytes of main memory and more than one 1G byte of disk storage, these figures were compiled

manually, and charts were produced by hand. It took three to four hours to complete each chart.

"We had 30 to 50 manpower loading charts that were produced manually on a monthly basis," said Christopher Picone, a Mare Island industrial engineer. "These charts are used by high-level management to keep tabs on ship repair projects. Key events are built into each project to act as milestones. Manpower charts help managers decide what adjustments are needed in the work force to ensure that key events are kept on schedule."

Picone's background is in industrial engineering, specifically, procedures improvement. Although his familiarity with computers is limited to some college course work and on-the-job usage, Picone said he has written "approximately 40 different" Info-Versagraph applications that are now in use. Most of these applications have replaced or supplemented manual systems or old software. Hundreds of man-days have been saved as a result.

To produce manpower loading charts, data is entered by management assistants into an Info-Versagraph program. Picone created to add, change and report manpower figures. Four data files are then updated by the program. Info-Versagraph's relational capabilities enable the files to work in concert and automatically produce a four-color line graph with up to six lines on a Hewlett-Packard Co. 7470A plotter.

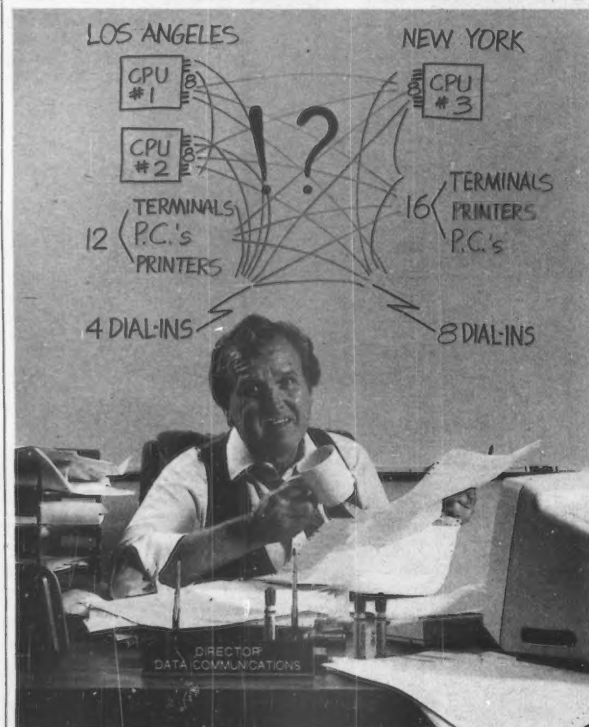
Charts are distributed to approximately 20 different sections throughout the shipyard. Management decisions are based on the interpreted trends displayed by each chart. Projects that may be lagging are detected, and adjustments to schedules are anticipated and the work force redistributed to meet new demands.

According to Picone, integrated data management and computer graphics have benefited both management and support staff at Mare Island. Info-Versagraph saves time for managers by allowing them to analyze and interpret manpower information in a timely manner.

More time is saved by eliminating the need to rekey data for a graphics package; keying errors are reduced as well. By eliminating the tedious process of producing hand-drawn graphs and by taking advantage of the computerized graphics systems, manpower loading chart production and changes take one-twelfth to one-sixteenth of the time previously needed, Picone said.

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NEWS

OA helps county government keep track of its goals

ARLINGTON, Va. — County Manager Larry Brown tossed a heavy, worn leather Daytimer diary flat across his desk. "I used to track my goals on this," he said, ruffling through pages of handwritten notes.

He swiveled his chair around and punched several keys on a personal computer beside the desk. Orderly rows and columns scrolled up the screen.

"Now I use a personal computer to keep track of what I'm doing and compare it to what I should be doing."

"I'm not trapped behind my desk [as] much," Brown said. "Electronic mail has eliminated the mundane meetings and freed me up" to talk to county residents and employees.

He explained that he assigns each goal a number. Then, when meeting with county department managers, he uses his computer to record who was present, what was discussed and how much time was spent. Each entry is numbered according to its corresponding goal. The system allows him to tally time spent toward meeting specific goals or to list employees whose efforts helped accomplish objectives.

Brown is the top administrator for Arlington County, which covers a 27-square-mile, business-intensive area adjacent to Washington, D.C. With 154,000 residents and an annual budget of more than \$226 million, day-to-day operations are not unlike those of a large business in the private sector.

County savings

During recent years, Arlington County joined the ranks of businesses that introduced office automation in a big way. Officials, including Brown, report that automation is now saving the county time and money, has raised morale among employees and is providing taxpayers with a government that is more efficient and effective.

The county's office system is composed of NBI, Inc.'s System 64 Oasys 2000 network of four CPUs, 42 word processors and 38 personal computers, some of which are NBI and others that are IBM Personal Computers and Personal Computer XT's wired into the NBI system. The software used is NBI-supplied Multiplan and Lotus Development Corp.'s 1-2-3, which are used for data base management, spreadsheet, word processing and communications features.

The system is used to process the county's records, make lengthy revenue and expenditure projections, create systems to bill outlying jurisdictions for county services, obtain legislative up-

dates from the Virginia state government, allow workers access to information from the county's IBM 4341 mainframe computer and create, edit and share written documents.

Brown manages eight separate departments that provide an array of county services, including the departments of personnel, hu-

man services, police, fire, community affairs, library, public works and management and finance.

At the time of his appointment, the county had already begun the initial automation of offices by installing a number of word processors for fast document preparation.

George November, direc-

tor of technology and information systems for the county, said that it was not long after an NBI Oasys 3000 word processor arrived in the Department of Management and Finance in 1980 that other departments began seeing its benefits and asking for their own systems. County clerical workers were reporting a faster turn-

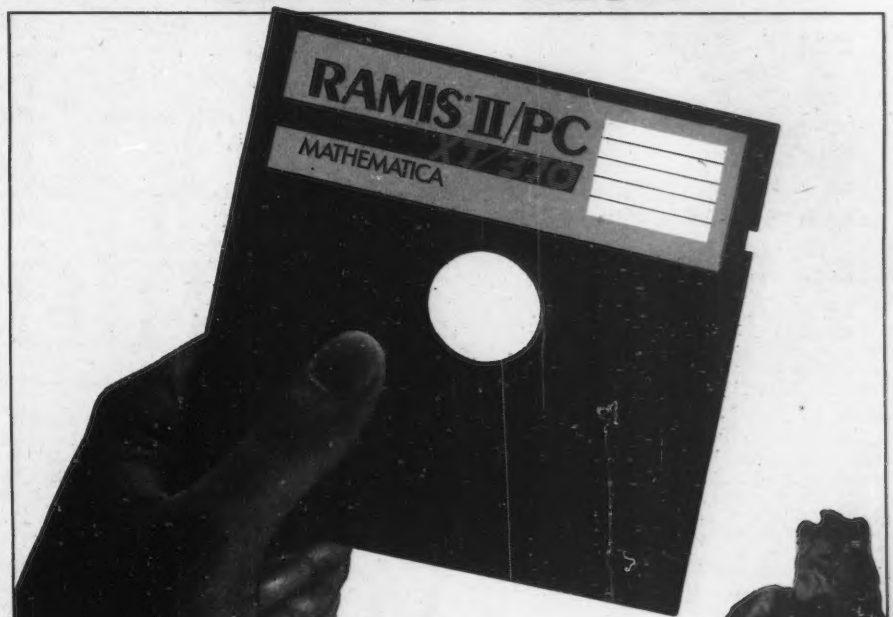
around time to produce written documents and to process records. Revisions and updates were simplified since they could be entered on the original document already in the system.

November said that although county employees were pleased with the word processors, literature was be-

See **COUNTY** page 48

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NEWS

COUNTY from page 47

ginning to emerge concerning the trend toward total office automation. Personal computers with communications features were showing up in offices alongside word processors. He said that although the county was making plans to acquire word processors, it was already apparent that it must also begin considering future personal computing needs.

An ad hoc, four-member committee was formed of two members each from the county's data processing and finance departments to evaluate word processing vendors.

"We initially formed the committee to try to standardize on a single system rather than wait for each department to do its own research [and commit to different vendors]," committee member November said. Standardizing with a single vendor meant price breaks on equipment and centralized training for all employees. With a standard system, information could be shared electronically throughout all county offices.

Suiting needs

Nancy Mathewson, a management analyst who was also a member of the committee, said that as the group tallied the benefits of major word processing vendors, the NBI system seemed to suit most appropriately the county's needs.

The committee wanted a system that was easy to learn and use and which offered features such as efficient long document handling, records processing and stored keystroke capabilities.

"We were primarily interested in providing a shared system," she said, a system in which a number of operators are connected to a central processor, enabling operators to swap information quickly and provide economies through the shared use of printers and other peripherals.

Proliferation

November maintained that it was not until Brown arrived that the county began to automate in a big way. "Our attitude was," Brown said, "Let's try it, get people used to it and see some results." Now it is proliferating through the ranks. People found out that automation provides a cost-effective way to increase productivity.

"I learned word processing by putting together my 1983 budget report," Brown said.

"What used to take two weeks, took just three days this year." Instead of writing numerous drafts, he said, the process went like this: "I wrote the first draft on Saturday. I revised it on Sunday and sent it [electronically] to members of the finance department. They made their changes and sent it back. I transferred it to my administrator, who put on the finishing touches and brought up the hard copy. I got final comments, made the changes and had it to the printer by Monday afternoon."

Training for the staff was accomplished by having a small group of employees extensively trained by NBI, and they in turn became the in-house training staff. Several users groups dedicated to hardware and software continue sharing information and experience.

Brown said he believes the system is already providing cost savings through increased productivity. "My

office alone would require a minimum of two more clerks" to handle paperwork, he said.

Managers tend to do their own word processing instead of delegating that to typists because the word processing is so easy, he said, and the textual material is often tied to whatever programs they are working on.

For instance, staff in the Management and Finance Department use the spreadsheet capabilities and graphics of 1-2-3 to do their projections and no longer need to have charts typed out.

"I think all departments are finding that the computers work as analysis enhancers," Brown said. "A 20-year projection of the budget takes two days. It used to take two weeks. And with the computer, it's more accurate."

"Of course, as they say: Garbage

in, garbage out," Brown cautioned. "You have to have a sense of organization to make the system work most effectively."

Problem never materialized

A major start-up problem that county officials initially anticipated — fear of learning to use the computers — never really materialized. "Some people are resistant to technology," management analyst Mathewson said, "but most people loved the system; they could see how much easier their jobs could be. It reduced the repetitive work."

"Personally, I can't stand to have a machine on my desk and not know how to use it," Mathewson said.

Mathewson recently projected county expenditures for automotive equipment.

By creating "what if" scenarios

with a spreadsheet application on her personal computer, she was able to determine the merits of potential automotive lease-purchase options compared with a plan in which the county would buy the vehicles outright.

'Saving innumerable hours'

"This system is saving me innumerable hours of work. In the past, I would have used a calculator. If the facts changed, I would have to do the entire problem over. Now I just edit the original," Mathewson said.

"Everyone's a convert," she added, "It's been good for morale. People see us giving them the tools they need to do their jobs."

"We're realizing that there's more out there to help us become a more responsive government," Mathewson said.

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NEWS

On-line management package keeps Avco informed

STRATFORD, Conn. — Avco Lycoming, a division of Avco Corp., manufactures gas turbine engines for marine, aviation and manufacturing applications. From its data center at headquarters here, the company communicates with manufacturing facilities in Connecticut, South Carolina and Pennsylvania.

A network of 620 terminals is linked to Avco Lycoming's mainframe, where administrative, engineering, financial and manufacturing data is maintained. As Avco Lycoming's telecommunications network grew, a system was needed to manage the network.

As networks go, according to John Mroz, supervisor of the company's

network management group, Avco Lycoming's system was small three years ago. Then, only 25 terminals communicated with an IBM 360 mainframe. A series of upgrades, first to an IBM 3033 and then to the current 3081, laid the foundation for the firm's network expansion. That expansion is still under way. By 1985, Mroz said, more than 800 terminals will be linked to the data center.

When Avco Lycoming's network was first established, a trouble desk was set up within the company so that malfunctioning equipment and software could be reported and fixed. Originally, one person took calls and filled out "trouble tickets," which

were manually forwarded to the appropriate area for resolution. The contact person handling the problem filled in the time, date and nature of the resolution and returned the ticket to the trouble desk. At month's end, statistics were compiled for management analysis.

"The problems ranged from 'I don't know how to log on' to 'I pushed all the right buttons, and it still won't work,'" Mroz said. "But we needed better information. For example, how many calls came in a day? A month? How long was a particular terminal down? What was the real source of the problem? What was its impact? Who fixed the problem? What was the response time? Our

network management staff needed to know what was happening and why."

Mroz said the manual system worked fairly well for the first year, but it had some basic flaws. Too much time was spent recording information manually, and calls reporting new problems interrupted the process of compiling statistics on current ones.

"We missed some things," he explained. "The system was subject to human frailties. In some cases, tickets were lost or forwarded too late or just filled out improperly."

Search begins

By the second year, Avco Lycoming needed an on-line network management system to handle its growing needs. A committee was formed to analyze available products. After an initial review, the field of software offerings was narrowed down to three. The committee visited the vendors, witnessed product demonstrations and talked to users.

On the basis of the package's problem, inventory and financial tracking capabilities, Avco Lycoming selected California Software, Inc.'s Netman network management system. Mroz said that after the package was installed on the IBM mainframe, a committee of four shared the responsibility of building its data base. A system that maintained physical inventory and financial data was already in place under TSO on the IBM 3081, and then it was transferred to Netman, accounting for the largest portion of the new system's data base.

According to Mroz, Netman has been tracking network problems for Avco Lycoming since January.

"Its impact was felt immediately. The tracking information it provides is passed on to supervisors and managers through reports that are generated after each shift. In addition, monthly summaries are produced more easily."

Netman's plusses

Mroz explained that Netman has also allowed the company to track vendor response time and effectiveness. Meetings are held with major vendors to discuss problems that have occurred during the previous week, and, once a month, the vendor and a management committee review the total network picture. "Now we can talk to vendors with real facts, and they can respond in a meaningful way," Mroz said.

Although problem tracking was of top priority, Avco Lycoming is also making use of the inventory and financial tracking data Netman provides. In the company's expanding network, new equipment is regularly installed, Mroz said. Equipment inventories and associated financial data are entered into Netman, allowing management to track new products from time of order to installation.

"Inventory reports are generated on request," Mroz said. "They give an up-to-date picture of the network and its individual parts. Financial reports are also generated every month, when bills are paid, to verify invoices. We needed a system that would help us maximize our uptime, and Netman has given us more efficient operations in every way."

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Graphics tool allows students to apply engineering theory

Engineering graphics package allows for creation, modification of chemical processes

HOBOKEN, N.J. — Working with computer graphics simulations of complex chemical reactions, chemical engineering students at the Stevens Institute of Technology here are developing design skills on a par with those of professional engineers.

According to Donald Sebastian, associate professor of chemistry and chemical engineering at Stevens, the school's chemical process simulation system, which utilizes the DI-3000 device-independent graphics software tools package from Precision Visuals, Inc., allows students to create and modify graphics models of industrial-scale chemical reactors interactively.

"Our simulation system enables students to apply the principles they learn in the classroom and laboratory," Sebastian said. "The system serves as the educational counterpart of a chemical engineering [computer-aided design] system, permitting the students to solve chemical process design problems approximating those they will face as professional engineers."

Using the chemical process simulation system, students can generate line graphs and bar charts that condense the numerical results of complex simulations into a single, easy-to-grasp presentation. Because the system's graphics subroutines are device-independent, students can produce graphics output on virtually any of the school's graphics terminals and plotters.

Stevens Institute, established in 1870, offers its 1,600 undergraduate students programs in engineering, science, computer science and sys-

tems planning and management. On the graduate level, 1,400 students are enrolled in 16 programs leading to master's and doctoral degrees. As the first major educational institution in the U.S. to require freshman students to own a personal computer (Digital Equipment Corp.'s Professional), Stevens committed itself to integrating computer technology throughout its curriculum.

Stevens' chemical engineering simulation system runs primarily on a VAX-11/780 computer, operating

VMS with 4M bytes of main memory and 772M bytes of disk storage, located in the school's computer center five blocks from the chemical engineering building. Terminals in the chemical engineering building are linked to the VAX via an Ethernet-type local-area network from Ungermann-Bass, Inc., which spans the entire 55-acre campus.

Most of the system's program development and virtually all of its computation-intensive applications are done on the VAX, which typically supports 12 users. Test programs for the system are run on a Decsystem-10 time-sharing mainframe running Tops-10 with 4.5M bytes of main memory and 2.5G bytes of disk storage, also located in the computer center, which supports up to 100 users.


"Because DI-3000 is machine-independent, as well as device-independent, we can transport software developed on the VAX to the Decsystem-10 for testing by a large number of users," Sebastian said. "As a result, we've been able to make much more rapid progress than

would have been possible if the system's graphics components were limited to running on the VAX."

The initial graphics development for the system was done using 11 ID100 terminals from ID Systems Corp. These terminals are DEC VT100 terminals retrofitted with a graphics board and full-color, high-resolution screen. In November 1983, the Stevens chemical engineering department acquired 12 Envision Technology, Inc. Envision 230 terminals for use with the system.

"With their alphanumeric capability, the ID terminals were well-suited to program development, but their graphics functionality was limited, even though they did provide good color and resolution," Sebastian said. "Here DI-3000 was a blessing since it enabled us to emulate most of the functionality of the vastly more intelligent Envision terminals in software. As a result, we could still do the development and see how to structure the programs that would ultimately run on the Envisions."

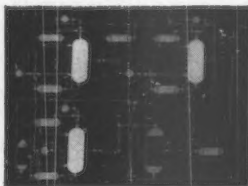
"The Envision terminals will be the workhorses in our chemical engineering teaching environment," he continued. "By providing a firmware display list that supports an extensive picture memory, they permit rapid picture manipulation, zooms



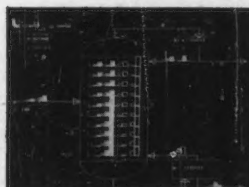
Device drivers written by Precision Visuals interface the Envision terminals and both types of plotters with device-independent DI-3000 graphics subroutines used in the simulation system. With the help of a skeleton supplied by Precision Visuals, Sebastian wrote the device driver for the ID100 terminals.

According to Sebastian, the chemical reaction simulation system will play a key role in a program to up-

See **MODEL** page 52



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NEWS

Flexibility key in multinational's choice of software

FARMINGTON, Conn. — When it came time to choose a "total solution" package of data base management system, financial and manufacturing software and fourth-generation productivity tools, a \$1.7 billion multinational manufacturer of hardware, electronic components, machines and chemical products found that the key issue was flexibility.

Flexibility was needed, according to Dave Dandro, director of information systems for Emhart Corp., both in the firm's long-term strategy toward handling its information resources and in the software it would eventually choose. Emhart, he said, is "primarily a collection of medium to small manufacturing companies, so we don't have any huge applications. Our primary concern has been the flexibility of utilization for smaller firms."

Flexibility was also needed because of the variety of computer hardware in use at Emhart's 126 plants. The existing computer systems had been installed without an overall plan and included equipment from IBM, Sperry Corp., Burroughs Corp., Digital Equipment Corp., Data General Corp., Siemens A.G. and Honeywell, Inc.

To gain the needed flexibility, Dandro said, last year Emhart chose the Cullinet Database and Applications Software package from Cullinet Software, Inc. During a 15-month study that preceded the choice, Dandro said the firm considered data base software from Cincom Systems, Inc., Applied Data Research, Inc. and IBM.

Long-term solution

During that study period the firm looked at what might be "the long-term solution for a corporation in terms of managing its data resources. We felt it was necessary that we have the solution in terms that would be sound from a data processing point of view and from a manufacturing administration management point of view." Which was why, Dandro explained, the firm chose a package that integrates its data base management system into its manufacturing and financial software. Emhart decided, Dandro said, that "We're not buying just a few applications, we're buying a total concept."

The Cullinet software included a data dictionary, fourth-generation programmer productivity tools, financial and manufacturing software — such as materials resource planning and order entry software — and the data base management system. The programmer productivity tools and

fourth-generation language received particularly high marks from Dandro, who said, "We really have a need to deliver systems effectively without long development times."

The package's manufacturing software, he noted, allows modules of programming to be created and reused in later programs.

"They allow us to get a base built quickly so we don't have to reinvent the wheel every time we do it," he explained.

The Cullinet software runs on any IBM or compatible computer under any of IBM's 370 instruction set-based operating systems, Dandro said, adding that this made it a good choice for use

with the firm's variety of computers. The software will be implemented gradually at each of the firm's plants and is so far only in 66 of them, those where IBM mid-range computers are in use.

"We're doing the installation taking a rational approach. We're not forcing it; we're making it happen over a long period of time," he

said.

Dandro said it was too early to tell if there will be any hitches with the software or its installation. "The biggest problems we've had have been in the area of our own personnel adapting to the way we do the business and in re-examining the way we function. That's probably the biggest hitch."

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NEWS

MODEL from page 50
grade Steven's chemical engineering curriculum.

"During the last decade, there has been a growing disparity between the level of chemical engineering education and the workday reality of the professional engineer," Sebastian said. "With our simulation system, however, we have taken an important step toward bridging this gap. Using the system, students can solve problems of much greater scope and intensity than they have been given in the past."

Sebastian explained that, beyond classroom instruction, chemical engineering education at Stevens has traditionally employed two approaches: laboratory work involving a good deal of trial and error and the mathematical solution of elementary analytical balance equations.

Laboratory experiments

In their laboratory experiments, students physically combine small-scale chemical process equipment such as valves, heaters, coolers and other components to create chemical processes that produce a designated chemical compound. Components of different types and sizes are added to and removed from the system — with tests run for each process configuration — until the required chemical is produced in the most cost-effective manner.

"Both the conventional hands-on and the theoretical approaches have serious limitations," Sebastian said. "In their laboratory work, students can perform only rudimentary experiments, and in their work with equations, they are limited by their level of math training — typically only two years of calculus. We needed a means of giving students a practical introduction to real-time chemical processes and the behavior of industrial-scale reactors."

Aware of the benefits of simulation systems for complex training tasks, Sebastian began work in 1981 on a Fortran system that would present students with realistic simulations of chemical processes occurring in an industrial plant. By spring of 1983, the essential hardware for the system was purchased, and programming efforts were intensified. By January 1984, a number of programs had been developed for each of Stevens' undergraduate chemical engineering courses.

One typical chemical engineering program is used to model a distillation tower

and to analyze its behavior. The program presents a series of formatted screens, through each of which the student navigates by tabbing the cursor from entry to entry, keying in data for structural components, flow rates, temperatures, pressures, chemical concentrations and so on — or accepting default values. The student can move back and forth between screens, modifying the input until he is satisfied with the structure of the tower.

Once the input to the program has been completed, the student initiates processing. The program's first output is a line drawing of the tower on the terminal screen, which shows all of the reactor's specified components, including its distillation trays. On each tray is a bar graph summarizing that tray's relative liquid and vapor composition.

To view the detailed numerical data for any given tray, the student has to move

the graphics cursor to that tray, then strike a key to command the system to display an alphanumeric table showing the particulars of that tray's concentrations, temperatures and pressures. With another keystroke command, the student can print this information.

The distillation tower analysis program also offers a series of line graphs displaying the relationship of up to 50 different combinations of dependent and inde-

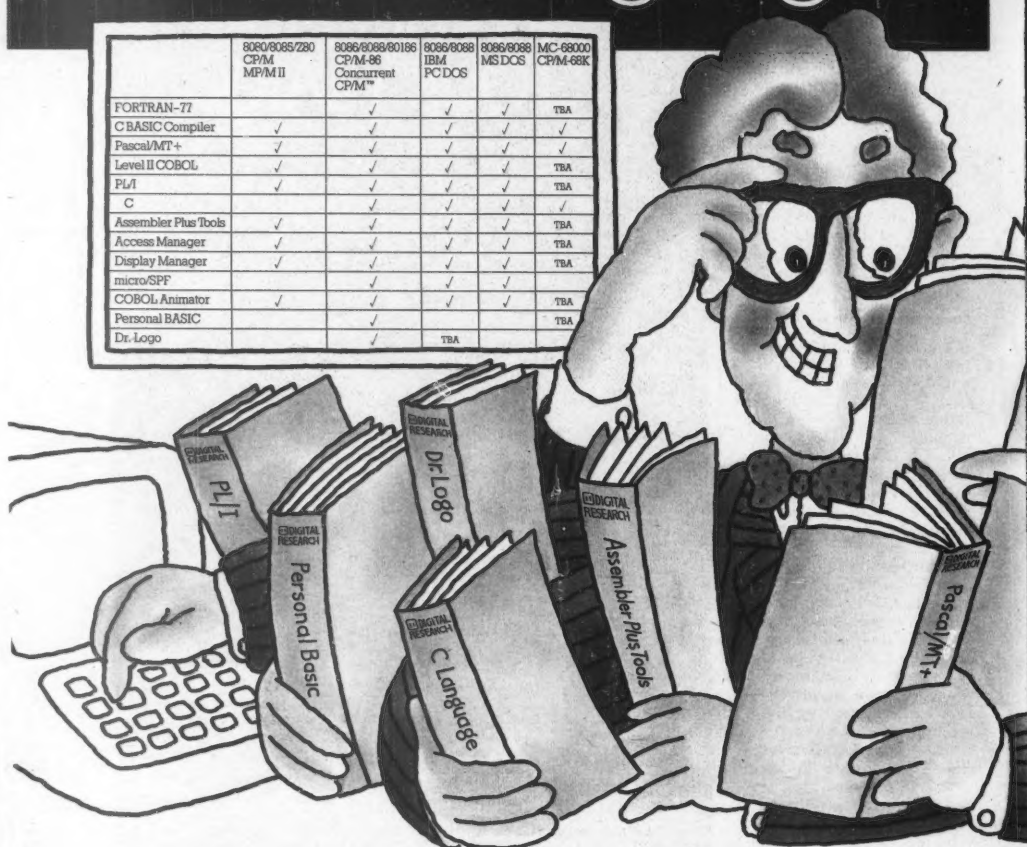
pendent variables. By selecting from a menu, the student can specify the variables to be correlated.

Sebastian plans to integrate the students' personal DEC Professional micros as dedicated workstations with the simulation system.

Students will thus be able to download a portion of the calculations and nearly all of the I/O processing, leaving the system's large-scale computation and data-storage to the host.

We wrote the book on portability. In nine different languages.

	8080/8085/286 CP/M MP/II	8086/8088/60186 CP/M-86 Concurrent CP/M™	8086/8088 IBM PC DOS	8086/8088 MS DOS	MC-68000 CP/M-68K
FORTRAN-77		✓	✓	✓	TBA
C BASIC Compiler	✓	✓	✓	✓	✓
Pascal/MT+	✓	✓	✓	✓	✓
Level II COBOL	✓	✓	✓	✓	TBA
PL/I	✓	✓	✓	✓	TBA
C		✓	✓	✓	✓
Assembler Plus Tools	✓	✓	✓	✓	TBA
Access Manager	✓	✓	✓	✓	TBA
Display Manager	✓	✓	✓	✓	TBA
microSPF		✓	✓	✓	✓
COBOL Animator	✓	✓	✓	✓	TBA
Personal BASIC		✓	✓	✓	TBA
Dr. Logo		✓	TBA		



NEWS

Portables help grocery chain manage perishables

JACKSON, Miss. — When you are selling perishable items like meats and dairy products in a 50-store, two-state area, your inventory control and order entry are critical. McCarty-Holman Co., a Mississippi-based grocery store chain, in recent years developed, step-by-step, a data processing system that enters orders and

submits inventory and audit records to the home office's IBM 4341 host. The host, in turn, delivers pricing changes and inventory reports back to its stores.

According to Jerry Warren, McCarty-Holman's director of MIS, the key to the data processing system is an MSI Data Corp. MS/88 user-programmable, hand-held

terminal and accompanying bar code scanner.

McCarty-Holman has been using MSI data entry portables since 1974, continuously upgrading them as the technology changed in the Costa Mesa, Calif.-manufactured products.

In 1979, McCarty-Holman migrated from its MSI Source 2100 terminals, which had

reduced order entry times by 10% to 20% over conventional key entry methods, to the MSI/88 terminals that are in use today.

The MSI/88 allows store employees equipped with the unit and an optical wand scanner to read six-digit bar codes on shelf-stocked goods. When the wand is passed once over the bar code, the

action is interpreted by the MSI/88 terminal as an order for one case of the grocery item. If passed twice over the same bar code, then it is interpreted as an order for two cases of the item.

Header codes allow the operator to designate items for specific departments within the store; those orders are then transmitted to the host IBM 4341 and processed separately.

While the introduction of the MSI/88 was the second phase of automating the order entry and inventory control program at McCarty-Holman, Warren's main objective was "to increase our data processing capabilities with faster processing and more on-line applications."

The third phase of the plan, Warren said, was the installation of the IBM host 4341 and the placement of MSI's top-of-the-line MSI/88 user-programmable terminals and National Semiconductor Corp.'s Datachecker in-store scanning systems for a total system approach that permits two-way communications between corporate headquarters and the 50 retail sites.

According to Warren, McCarty-Holman has invested some \$50,000 in the MSI/88s and an additional \$10,000 in proprietary software developed to monitor inventory and price auditing by the IBM host.

Warren said that more up-to-date sales data is now possible for collection from the stores, and a more rapid turnaround time is achieved from the time of order entry to the time the product is stocked on the shelves, alleviating the need for extra storage space allocation in the stores.

An entire store can be audited on-site in approximately 40 hours using the MSI/88s interfaced to the Datachecker point-of-sale (POS) scanning system using software programs written for both systems. The retail price audit program for items shipped either from the warehouse or direct to stores from vendors offers a quick and effective means of price verification as well as shelf and product status reporting.

Universal Product Codes and prices are entered into the terminal with any pertinent shelf status conditions and transmitted to the Datachecker for processing and reporting.

McCarty-Holman operates 12 wholesale stores that are subject to frequent pricing changes, and the MSI/88 terminals, interfaced with the Datachecker POS scanning systems, provide immediate on-site audits and pricing verifications.

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NEWS



MANAGERS ON THE MOVE

ERNEST A. BOTTE has been named corporate director of management information systems for Compo Industries, Inc. in Waltham, Mass. He will be responsible for the direction, planning and long-range methodologies and strategies of Compo's data processing services and facilities.

Compo is a supplier of synthetic leather products, chemicals and equipment to footwear, apparel and other industries



Botte

that are located in the U.S.

Prior to joining Compo, Botte was manager of information systems at Sweetheart Plastics, Inc. in Wilmington, Mass. He also worked for Data General Corp. and First National Stores.

Botte graduated from Northeastern University with an A.S. in electronic data processing and a B.S. in management information systems.

STEPHEN G. BEEBE has been appointed vice-president and controller at GTE Telenet Communications Corp. in Vienna, Va.

Beebe, a GTE employee since 1967, most recently served as assistant general manager and controller at GTE Telenet Information Services in Mount Laurel, N.J.

From 1970 through 1981, Beebe held various positions in financial

management, including that of director of financial planning and analysis at GTE's Lighting Products Group in Danvers, Mass.

A graduate of Middlebury College in Middlebury, Vt., Beebe holds an A.B. in economics. He also earned an MBA from the University of Chicago.

JAMES D. WELLS JR. has been appointed director of management information systems for the Lincoln Division of McNeil Corp. in St. Louis.

He will direct the division's information and data processing functions. In addition, he will have responsibility for all hardware, software development and telecom-



Wells

munications for the division.

Wells' systems career has spanned 15 years, during which he served most recently with Cooper Manufacturing Co. in Tulsa, Okla. Earlier, he had been employed by MCC Powers and Texas Instruments, Inc.

In 1968, he earned a liberal arts degree from the University of Rhode Island, and he earned his master's degree in 1972.

ROBERT CARPENTER has been promoted to senior vice-president of the information service division for Insurance Co. of the West, which is headquartered in San Diego.

He will be responsible for all data processing for the company and for the implementation of new systems.

Carpenter holds a B.S. in computer science from the Carpenter University of South Carolina in Columbia, S.C.



RALPH JAMES has been promoted to vice-president of data processing and technology for Regulatory Information Service, a division of Congressional Information Service, Inc. (CIS).

James had been DP director at CIS since 1981. He was formerly employed by Coopers & Lybrand as director of information services.



CALL FOR PAPERS

THE 1985 AMERICAN SOCIETY OF MECHANICAL ENGINEERS INTERNATIONAL COMPUTERS IN ENGINEERING CONFERENCE AND EXHIBITION

Boston, Aug. 4-8, 1985

Papers are being solicited in all areas related to the research, development and application of computers in mechanical engineering, with an emphasis on expert systems. Contributions in the form of a full-length paper or an extended abstract are solicited.

Submission of abstracts must be made by Nov. 15. Finished contributions (three copies) of papers or extended abstracts are due Jan. 15.

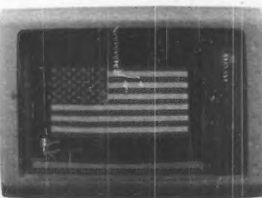
Information is available from Dr. Steve M. Rhode, Power Systems Research Department, General Motors Research Labs, Warren, Mich. 48090.

INTERNATIONAL CONFERENCE ON INTERACTIVE INFORMATION AND PROCESSING SYSTEMS FOR METEOROLOGY, OCEANOGRAPHY AND HYDROLOGY

Los Angeles, Jan. 7-11, 1985

Papers for this conference, sponsored by the American Meteorological Society, are being solicited on the topics of interactive systems; teleconferencing; systems, technologies and applications for developing countries; and others.

Titles and abstracts should be sent by Aug. 1 to the attention of G. Stanley Doore, Office of the Federal Coordinator, Suite 300, 11426 Rockville Pike, Rockville, Md. 20852.



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NEWS

SURVEY from page 1

ed, or "other," IBM mainframes resulted in only slightly more than 50% of those polled saying they were willing to recommend their systems to other users.

As a group, users of IBM and compatible systems appear strongly convinced that their systems have met their expectations. The survey revealed 100% of the users of Amdahl Corp.'s 470/580, IBM's 4361 and 4381, IBM 30 series, the "other" category of IBM mainframes, IPL Systems, Inc.'s 4400 series and Magnuson Computer Systems' M80 said the systems had lived up to their expectations. Other systems that received the same 100% mark include Sperry Corp.'s 1100/80 line, Honeywell, Inc.'s DPS 7 processor and Burroughs Corp.'s B2800, B3900 and B4800 models.

Respondents to this year's survey were fairly consistent in the assessment of the quality of their systems. For example, asked to rate their overall satisfaction on a scale of one to four (four being an excellent rating) the median rating was 3.23 with only a .41 spread between the highest and lowest overall satisfaction ratings.

Other survey results indicated:

- The quality of vendor documentation appears to be a sore spot among mainframe users. Users of various vendor's mainframes consistently gave documentation the lowest marks out of a series of questions relating to overall system satisfaction. In the same four-point rating scale, users gave the quality of documentation a median rating of 2.5. The best documentation is available with IBM's 3031, 3032 and 3033 processors; the worst comes with Burroughs' B5900 system, users said. Users said the quality of documentation has improved slightly in the past year. Asked to rate documentation in last year's survey (CW, May 16), users gave documentation an average rating of 2.3.

- Users of IBM mainframes appear to be evenly divided between purchasing and leasing their systems. Datapro said 50.54% of users polled purchased their systems from IBM. Interestingly, a majority of the remaining users who rent or lease their IBM systems do so from third-party companies. The survey said 32.5% of IBM users lease from a third party. Only 16.69% of users said they rent or lease a system directly from IBM.

- It should be noted that Datapro surveyed far more IBM users than IBM-compatible systems users (by a 9:1 ratio). However, users of plug-compatible manufacturers' (PCM) systems gave their CPUs generally higher marks than IBM users. In fact, systems manufactured by National Advanced Systems, Inc. (NAS) pulled in the highest score in the overall satisfaction category. The NAS systems were rated at 3.44. Systems manufactured by Amdahl fared about as well as, but did not exceed, ratings given IBM systems.

- On the other end of the satisfaction scale, users gave Honeywell's DPS 8 series of processors the lowest overall satisfaction rating of 3.03. Ironically, 97% of those users said the DPS 8 lived up to their expectations; but only 76.47% said they would recommend the system to others. The 76.47% recommendation rate was the lowest of all users polled. Other systems that received

comparatively low user satisfaction ratings include: the Honeywell DPS 7 series (a 3.09 rating); NCR Corp.'s 8400, 8500 and 8600 series processors (3.08); and IBM's 4341, 4361 and 4381 processors, which received a 3.11 overall satisfaction rating.

The two most financially troubled vendors listed in the survey, IPL Systems and Magnuson, offer systems that compete against the low-rated IBM 4341, 4361 and 4381 processors. Ironically, IPL and Magnuson systems received much higher overall satisfaction ratings, 3.25 and 3.33, respectively.

Again, it should be noted that Datapro questioned far more IBM users than PCM users. For example, 253 users of the high-end 4300 series systems were polled, while 12 IPL users and seven Magnuson users were questioned.

Datapro survey: How it's done

DELRAN, N.J. — Datapro Research Corp.'s 1984 survey was based on the results of 15,000 questionnaires mailed to known mainframe and minicomputer user sites. The list of computer sites was supplied by Framingham, Mass.-based market research firm International Data Corp. (IDC).

Of the 15,000 questionnaires, 3,404 responses were received from 3,261 respondents (a 22% return). Of the total responses, 352 were judged to be invalid. The result was 3,052 valid responses from 2,909 users.

Of the valid responses, 1,079 rated mainframe computer systems (an 18% return on the 6,000 surveys mailed to mainframe users) and 1,973 rated minicomputers (for a return of 22% on the 9,000 surveys mailed to minicomputer users).

Copies of the "1984 User Rating of Computer Systems" cost \$29 and are available from Datapro at 1805 Underwood Ave., Delran, N.J. 08075.

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Users Rate Their M

Manufacturer and Model													
		Amdahl 470/580	Burroughs B 2400, B 2800, B 4800	Burroughs B 2400, B 2800, B 4800	Burroughs B 2400, B 2800, B 4800	Burroughs B 5500	Burroughs B 6500	Digital Equipment DECsystem-10/20	Honeywell DPS 7	Honeywell DPS 8	IBM 4331	IBM 4341	IBM 4381 & 4381
Survey Item													
No. of User Responses		30.	16	72	19	10	54	11	34	184	244		
Avg. Life of System (months)		38.8	59.1	30.0	26.2	37.6	70.1	26.3	33.0	43.7	35.1		
Acquisition Method (%)													
Purchase		43.33	37.50	54.17	68.75	70.00	84.62	72.73	52.94	56.28	44.03	44.44	
Rental or Lease from Mfr.		26.67	43.75	33.33	18.75	30.00	1.92	18.18	26.47	20.77	18.52	22.22	
Lease from 3rd Party		30.00	18.75	12.50	12.50	0.00	13.46	9.09	20.59	22.95	37.45	33.33	
System Ratings (4.0-1.0)													
Ease of Operation		3.43	3.75	3.76	3.56	3.70	3.62	3.27	3.27	3.14	3.19	3.19	
Reliability of Mainframe		3.57	3.44	3.49	3.31	3.30	3.35	3.64	3.39	3.69	3.75	3.19	
Reliability of Peripherals		3.38	3.06	3.03	3.31	3.00	3.15	3.55	3.24	3.51	3.51	3.03	
Maintenance Service													
Responsiveness		3.83	3.06	3.33	3.19	3.40	3.40	3.18	3.45	3.45	3.48	3.19	
Effectiveness		3.60	3.00	3.22	2.88	3.30	3.25	3.09	3.06	3.46	3.47	3.19	
Technical Support:													
Trouble-shooting		3.47	3.00	2.77	2.34	3.00	3.00	2.73	2.91	3.01	3.03	3.03	
Education		3.27	2.86	2.89	2.87	2.78	2.67	2.84	2.73	2.89	2.97	3.03	
Documentation		3.03	2.44	2.61	2.18	2.87	2.81	2.84	2.47	2.85	2.83	3.03	
Manufacturer's Software:													
Operating System		3.12	3.69	3.78	3.56	3.90	3.52	3.18	3.21	3.19	3.13	3.19	
Compilers & Assemblers		3.11	3.31	3.32	3.25	3.70	3.36	3.27	3.21	3.37	3.22	3.19	
Applications Programs		2.85	2.93	2.69	2.82	2.67	2.85	2.40	3.52	2.91	2.87	3.19	
Ease of Programming		2.78	3.47	3.46	3.31	3.40	3.39	3.00	3.09	2.99	2.91	2.78	
Ease of Conversion		2.90	3.21	3.30	3.14	3.30	3.06	3.09	2.81	2.87	2.82	2.78	
Overall Satisfaction		3.14	3.40	3.31	3.31	3.30	3.31	3.09	3.03	3.17	3.11	2.78	
Additional Ratings (4.0-1.0)													
Ease of Reconfiguration		3.45	3.47	3.49	3.40	3.30	3.20	3.36	3.13	2.98	3.06	3.45	
Compatibility of Hardware carried over from other systems		3.69	2.69	3.14	3.13	3.00	3.27	2.91	2.41	3.04	3.25	3.45	
Compatibility of Programs/data carried over from other systems		3.72	2.88	3.18	3.07	3.10	2.98	3.27	2.81	2.97	3.21	3.45	
Power/energy Efficiency		3.19	2.69	3.37	3.13	2.80	2.52	3.00	3.00	3.25	3.27	3.45	
Productivity Aids help keep programming costs low		2.95	2.93	2.96	2.63	3.30	2.63	2.64	2.48	2.69	2.71	2.95	
Software/Support promised by vendor		3.30	2.69	2.75	2.63	2.90	2.58	2.89	2.68	2.86	2.83	3.03	
Keeping up with & implementing vendor changes to hardware/software (very easy=4.0; very difficult=1.0)		3.13	3.26	3.39	3.06	3.10	2.86	3.30	2.97	2.88	2.63	3.03	
Delivery/Installation of equipment (ahead of schedule=4.0; very late=1.0)		3.03	2.50	2.89	2.81	2.80	2.90	3.00	2.97	2.99	2.99	3.03	
Delivery of required Software (ahead of schedule=4.0; very late=1.0)		3.08	2.83	2.93	2.94	3.00	2.75	2.73	2.85	2.97	2.95	2.78	
Did the system do what you expected it to do? (%)													
Yes		100.00	93.33	100.00	75.00	90.00	90.74	100.00	97.06	98.37	98.36	100.00	
No		0.00	6.67	0.00	12.50	10.00	3.70	0.00	2.94	0.00	0.82	0.00	
Undecided		0.00	0.00	0.00	12.50	0.00	5.76	0.00	0.00	1.63	0.82	0.00	
Would you recommend system to another user? (%)													
Yes		98.67	98.67	98.57	81.25	90.00	79.83	90.91	76.47	95.06	97.54	100.00	
No		3.33	0.00	1.43	6.25	10.00	12.96	8.09	5.88	0.65	0.41	0.00	
Undecided		0.00	13.33	0.00	12.50	0.00	7.41	0.00	17.66	4.37	2.05	0.00	

Mainframes . . .

IBM 4381 & 4381	IBM 303X	IBM 308X	IBM Other Models	IPL 4400	Magnuson M80	NAS AS/6000, AS/7000, AS/9000	NCR 8400/8500/8600	Sperry 1100/60	Sperry 1100/70	Sperry 1100/80	Mainframes Other Models		
9 17.7	24 39.8	89 20.8	12 89.5	12 28.3	7 30.4	13 28.8	141 45.5	48 40.4	11 29.2	20 58.4	22 64.3		
44.24 22.22 33.33	54.17 4.17 41.67	56.18 10.11 33.71	50.00 0.00 60.00	33.33 66.67 0.00	50.00 33.33 16.67	38.46 30.77 30.77	53.19 24.11 22.70	27.08 60.42 12.50	27.27 63.64 9.09	31.58 63.15 5.28	37.14 33.33 9.52		
3.33 3.89 3.00	3.18 3.83 3.21	3.26 3.69 3.43	3.00 3.17 3.17	3.58 3.75 3.17	3.43 3.57 3.57	3.38 3.69 3.42	3.34 3.47 3.33	3.29 3.56 3.23	3.36 3.55 3.36	3.40 3.60 3.10	3.45 3.27 3.09		
3.56 3.56	3.67 3.54	3.47 3.36	3.08 3.25	3.08 3.33	3.71 3.43	3.54 3.46	3.29 3.10	3.44 3.23	3.36 3.27	3.65 3.30	3.38 3.18		
3.22 3.00 3.00	3.42 3.42 3.13	3.26 3.05 2.98	2.83 3.36 3.00	3.25 2.80 3.00	2.88 2.00 2.29	3.31 3.00 3.08	2.77 2.91 2.69	2.83 2.82 2.27	3.00 2.55 2.36	2.55 2.80 2.60	2.88 2.82 2.59		
3.11 3.22 3.11	3.38 3.50 2.83	3.34 3.33 2.84	3.17 3.25 2.64	3.38 3.58 3.13	3.20 3.20 2.67	3.30 3.22 3.33	3.21 3.12 2.54	3.40 3.29 2.57	3.36 3.55 2.89	3.50 3.58 2.58	3.41 3.36 2.76		
2.78 2.88 3.11	2.83 2.81 3.29	2.93 3.04 3.24	3.09 2.90 3.38	3.00 2.88 3.25	3.00 3.00 3.33	3.33 3.22 3.44	2.98 3.12 3.08	3.10 2.84 3.19	3.55 3.09 3.45	3.11 3.00 3.20	3.23 2.89 3.18		
3.44 3.25	3.22 3.57	3.19 3.38	2.92 2.92	3.27 3.50	3.17 3.80	3.31 3.75	3.32 3.15	3.06 2.55	3.60 2.82	3.22 2.75	3.14 3.06		
3.33	3.57	3.35	3.08	3.30	3.20	3.75	3.22	2.34	3.00	2.89	2.85		
3.44 2.89 3.00	2.70 3.00 3.30	3.28 2.67 2.94	1.92 2.90 3.09	3.60 2.88 2.60	3.17 2.50 2.00	3.17 3.12 2.92	3.31 2.70 2.49	2.94 2.55 2.54	3.00 3.18 2.82	3.00 2.33 2.95	2.86 2.64 2.73		
3.00	2.67	2.82	3.18	2.60	3.33	3.38	3.16	2.73	2.73	3.15	3.27		
3.33	3.04	3.13	3.08	3.00	2.86	3.08	2.89	2.94	2.91	2.85	3.09		
2.89	3.00	3.06	3.08	2.89	3.00	3.09	2.85	2.89	2.82	2.70	3.14		
100.00 0.00 0.00	100.00 0.00 0.00	98.88 0.00 1.12	100.00 0.00 0.00	100.00 0.00 0.00	100.00 0.00 0.00	92.31 0.00 0.00	92.20 2.84 4.96	91.67 9.09 6.25	90.91 9.09 0.00	100.00 0.00 0.00	95.45 0.00 4.55		
100.00 0.00 0.00	91.67 0.00 9.33	98.88 0.00 1.12	58.33 41.67 0.00	91.67 8.33 0.00	57.14 14.29 28.57	76.82 23.08 0.00	96.52 6.38 7.09	87.50 4.17 8.33	81.82 9.09 9.09	100.00 0.00 0.00	77.27 18.18 4.55		

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... And the Vendors of

Manufacturer and Model Survey Item	Amdahl	Burroughs	Digital Equipment	Honeywell	IBM	IPL	Magnuson	NAS
No. of User Responses	30	114	54	45	562	12	7	13
Avg. Life of System (months)	38.6	34.3	70.1	31.0	36.7	28.3	30.4	28.6
Acquisition Method (%)								
Purchase	43.33	55.26	84.82	57.78	50.54	33.33	50.00	38.46
Rental or Lease from Mfr.	26.67	32.46	1.92	24.44	18.96	96.67	33.33	30.77
Lease from 3rd Party	30.00	12.28	13.46	17.78	32.60	0.00	16.67	30.77
System Ratings (4.0-1.0)								
Ease of Operation	3.43	3.73	3.62	3.27	3.18	3.58	3.43	3.38
Reliability of Mainframe	3.57	3.42	3.35	3.45	3.72	3.75	3.57	3.69
Reliability of Peripherals	3.38	3.07	3.15	3.32	3.47	3.17	3.57	3.42
Maintenance Service:								
Responsiveness	3.83	3.28	3.40	3.39	3.47	3.08	3.71	3.54
Effectiveness	3.60	3.15	3.25	3.07	3.45	3.33	3.43	3.46
Technical Support:								
Trouble-shooting	3.47	2.85	3.00	2.86	3.08	3.25	2.86	3.31
Education	3.27	2.87	2.67	2.70	2.99	2.80	2.00	3.00
Documentation	3.00	2.53	2.91	2.51	2.88	3.00	2.29	3.08
Manufacturer's Software:								
Operating System	3.12	3.75	3.52	3.20	3.20	3.38	3.20	3.30
Compilers & Assemblers	3.11	3.35	3.36	3.23	3.30	3.56	3.20	3.22
Applications Programs	2.85	2.74	2.85	2.49	2.87	3.13	2.67	3.33
Ease of Programming	2.78	3.44	3.39	3.07	2.94	3.00	3.00	3.33
Ease of Conversion	2.90	3.30	3.06	2.88	2.88	2.86	3.00	3.22
Overall Satisfaction	3.14	3.32	3.31	3.06	3.17	3.25	3.33	3.44
Additional Ratings (4.0-1.0)								
Ease of Reconfiguration	3.45	3.45	3.20	3.19	3.07	3.27	3.17	3.31
Compatibility of Hardware carried over from other systems	3.69	3.06	3.27	2.53	3.21	3.50	3.80	3.75
Compatibility of Programs/data carried over from other systems	3.72	3.11	2.98	2.77	3.17	3.30	3.20	3.75
Power/energy Efficiency	3.19	3.19	2.52	3.00	3.21	3.60	3.17	3.31
Productivity Aids help keep programming costs low	2.95	2.94	2.63	2.52	2.72	2.88	2.50	3.17
Software/Support promised by vendor	3.30	2.73	2.58	2.72	2.89	2.60	2.00	2.92
Keeping up with & implementing vendor changes to hardware/software (very easy=4.0; very difficult=1.0)	3.13	3.30	2.85	3.05	2.85	2.80	3.33	3.38
Delivery/Installation of equipment (ahead of schedule=4.0; very late=1.0)	3.03	2.82	2.90	2.98	3.02	3.00	2.86	3.08
Delivery of required Software (ahead of schedule=4.0; very late=1.0)	3.08	2.89	2.75	2.82	2.98	2.89	3.00	3.09
Did the system do what you expected it to do? (%)								
Yes	100.00	94.69	90.74	97.78	98.58	100.00	100.00	92.31
No	0.00	3.54	3.70	2.22	0.36	0.00	0.00	7.69
Undecided	0.00	1.77	5.56	0.00	1.07	0.00	0.00	0.00
Would you recommend system to another user? (%)								
Yes	96.67	93.86	79.63	80.00	95.90	91.67	57.14	76.92
No	3.33	3.75	12.99	6.67	1.25	8.33	14.29	23.08
Undecided	0.00	2.65	7.41	13.33	2.85	0.00	28.57	0.00

of Those Mainframes

<div> <div>Manufacturer and Model</div> <div>Survey Item</div> </div>							
	NCR	Sperry	Other Mainframes				
No. of User Responses	141	79	22				
Avg. Life of System (months)	45.5	43.6	64.3				
Acquisition Method (%)							
Purchase	53.19	28.21	57.14				
Rental or Lease from Mfr.	24.11	61.54	33.33				
Lease from 3rd Party	22.70	10.26	9.52				
System Ratings (4.0-1.0)							
Ease of Operation	3.34	3.33	3.45				
Reliability of Mainframe	3.47	3.57	3.27				
Reliability of Peripherals	3.33	3.22	3.09				
Maintenance Service:							
Responsiveness	3.29	3.48	3.36				
Effectiveness	3.10	3.25	3.18				
Technical Support:							
Trouble-shooting	2.77	2.78	2.86				
Education	2.91	2.90	2.82				
Documentation	2.69	2.37	2.58				
Manufacturer's Software:							
Operating System	3.21	3.42	3.41				
Compilers & Assemblers	3.12	3.40	3.36				
Applications Programs	2.54	2.61	2.76				
Ease of Programming	2.96	3.17	3.23				
Ease of Conversion	3.12	2.78	2.69				
Overall Satisfaction	3.08	3.23	3.18				
Additional Ratings (4.0-1.0)							
Ease of Reconfiguration	3.32	3.17	3.14				
Compatibility of Hardware carried over from other systems	3.15	2.64	3.06				
Compatibility of Programs/data carried over from other systems	3.22	2.58	2.85				
Power/energy Efficiency	3.06	2.96	2.86				
Productivity Aids help keep programming costs low	2.70	2.59	2.64				
Software/Support promised by vendor	2.49	2.68	2.73				
Keeping up with & implementing vendor changes to hardware/software (very easy=4.0; very difficult=1.0)	3.16	2.84	3.27				
Delivery/Installation of equipment (ahead of schedule=4.0; very late=1.0)	2.89	2.91	3.09				
Delivery of required Software (ahead of schedule=4.0; very late=1.0)	2.85	2.83	3.14				
Did the system do what you expected it to do? (%)							
Yes	92.20	93.67	95.45				
No	2.84	2.53	0.00				
Undecided	4.96	3.80	4.55				
Would you recommend system to another user? (%)							
Yes	86.52	89.87	77.27				
No	6.38	3.60	18.18				
Undecided	7.08	6.33	4.55				

NEWS



OFF THE PRESS
George Harrar

BOOK REVIEWS

MARKETING HIGH TECHNOLOGY

By William L. Shanklin
And John K. Ryans Jr.

The typical high-tech company, the authors say, goes through three stages: patent-driven, supply-driven and demand-driven.

American industry may well be slackening its pace of innovation since 40% of U.S. patents today go to foreigners. Ideas that do make it out of the patent stage face an uncertain

future: "The marketplace for high-tech products exists, if at all, in a future that is often beyond most people's experiences. The thriving high-tech company is one that is perceptive and creative in response to problems or desires that are largely unknown to potential buyers or users themselves."

In other words, the company creates the product and then must create the market for it in the supply-driven stage. The mouse and the touchscreen are innovations that no one asked for. Apple Computer, Inc. and Hewlett-Packard Co. must sell those features. "No product idea has a manifest destiny that will propel it to market success," the authors write.

The book details companies moving from stage two to three. After supply has created demand, a differ-

ent kind of leader is needed at the helm — a John Sculley at Apple, for instance, or James Morgan at Atari, Inc., who switched from Philip Morris, Inc.

There are not enough markets for all with good ideas, particularly where hundreds of competitors battle each other in the microcomputer and robotics areas. Innovation followed by marketing can set a company apart, but there is a tendency to develop an obviously superior new technology while at the same time funding improvements in the old technology "just in case."

This book is written for vendors but is useful for DP managers who want to understand the forces working on vendors.

Hardcover, 216 pages, \$24, ISBN 0-669-06914-0, Lexington Books, D.C. Heath and Co., 125 Spring St.,

Lexington, Mass. 02173.

AN ANALYSIS OF CAD/CAM APPLICATIONS

By Richard Stover

The book opens with a good reason to read on: "An estimated 30% to 40% of all installed CAD/CAM [computer aided design and manufacturing] and computer graphics systems fail to achieve the productivity goals and the paybacks for which they were purchased."

If CAD/CAM is the leading edge in totally automating a factory, as the authors write, then the success or failure of CAD/CAM systems can determine whether a factory races or hobbles along toward automation.

As each aspect of CAD/CAM is discussed, vendors are listed who supply the appropriate products. Users are given enough information to understand the systems and measure what each vendor offers. Chapters include CAD/CAM and Graphics and CAD/CAM to Improve Productivity.

Hardcover, 290 pages, \$32, ISBN 0-13-032871-5, Prentice-Hall, Inc., Englewood Cliffs, N.J. 07632.

COMPUTER LAW: DRAFTING AND NEGOTIATING FORMS AND AGREEMENTS

By Richard Raysman
And Peter Brown

This loose-leaf book was written with utility in mind for both user and vendor readers. Explanations of hardware and software contracts as well as confidentiality agreements are coupled with forms which can be used to close the deals.

The lawyer-authors risk losing clients who buy the book and feel they do not need legal aid. Richard Raysman says, "I'm not suggesting that people should do without a lawyer. But I recognize that whether they should or not, many do."

This book is for those many who do, particularly smaller companies without an in-house legal department. The user with access to legal help in a larger corporation can use the forms as a comparison to the documents his lawyers suggest.

Hardcover loose-leaf, \$70, No. 00585, Law Journal Seminars-Press, 111 Eighth Ave., New York, N.Y. 10011.

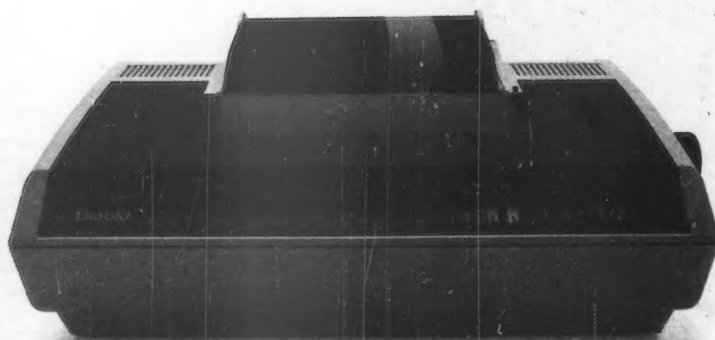
BOOKS OF NOTE

HANDBOOK OF SOFTWARE ENGINEERING, a single source for designing, implementing, testing and maintaining virtually any type of software, by Charles R. Vick and C.V. Ramamoorthy. Hardcover, 720 pages, \$62.50, ISBN 0-442-26251-5, Van Nostrand Reinhold, 135 W. 60th St., New York, N.Y. 10020.

DATA ANALYSIS: THE KEY TO DATA BASE DESIGN, showing how better to describe user data base needs to the designer, by Richard C. Perkinson. Hardcover, 285 pages, \$34.50, ISBN 0-89435-105-2, QED Information Services, Inc., QED Plaza, P.O. Box 181, Wellesley, Mass. 02181.

Publishers wishing to have their books considered for review can direct books, prepublication galleys, press releases, catalogs or other information to George Harrar, Book Review Editor, Computerworld, P.O. Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

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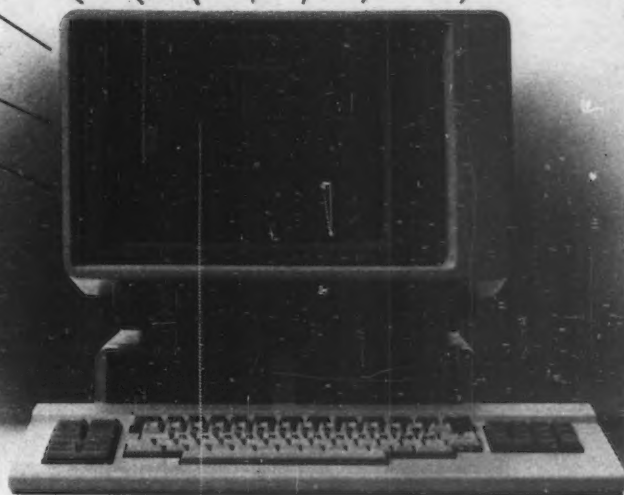
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file services, facsimile terminals, communicating Memorywriters, other networks and, of course, other Stars. It also provides 3270 and TTY emulation.

Its full 17" bit-mapped screen lets you view two full pages simultaneously and open up to six documents at a time without covering up a previous document.

It's also the only workstation that can create and print documents in more than a dozen languages, including Russian and, for the first time, Japanese (Katakana, Hiragana and Kanji).

While other workstations may use Xerox

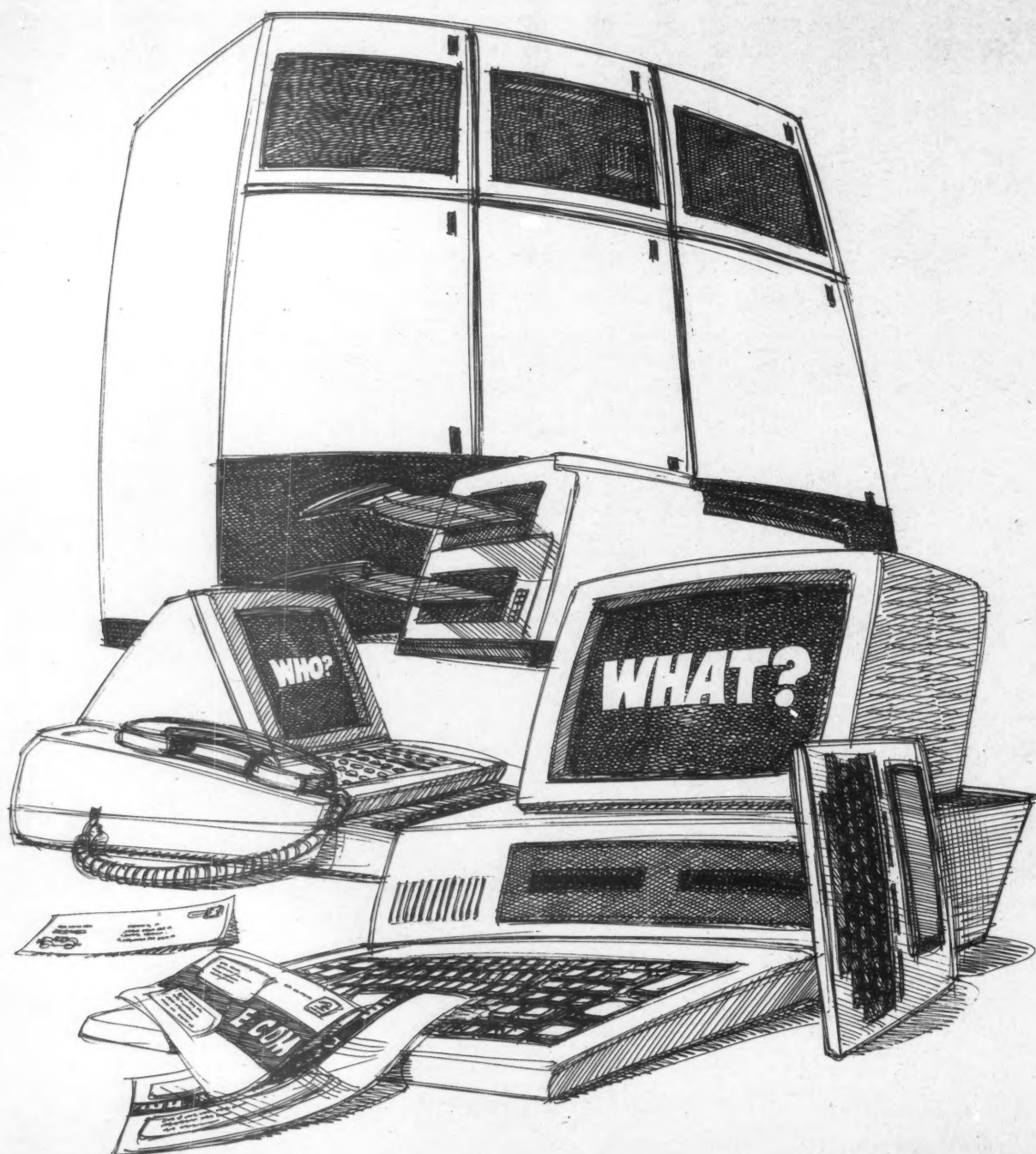
innovations like the mouse, icons, windows, property sheets and combined text and graphics, the Star simply does more with them.

For example, the Star's extensive software is fully integrated, to allow you to work with text and graphics simultaneously. You can draw a flowchart right in the middle of a full page of text without having to resort to a separate program and limited buffer "scratchpad" or "clipboard."

In terms of capabilities, ease of use and overall value, the Star would have to be considered the stellar workstation in the industry.

Booth 3524

What we is a failure to c



have here communicate.

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NEWS

Graphics software helping Army treat burn victims

By Maj. Larry Lehmer
and David R. Strome
Special to CW:

FT. SAM HOUSTON, Texas — The U.S. Army Institute of Surgical Research here treats between 200 and 300 severely burned patients each year.

The amount of clinical and laboratory data that a physician must analyze in formulating treatment plans

is vast. Graphics presentation of laboratory data can significantly improve the physician's use of laboratory information and result in enhanced patient care.

One of the oldest methods of reporting laboratory data is use of the single lab slip.

Its major disadvantage is that only a single time-point in the patient's hospitalization is reported; the physician must find the patient's chart and review many other single laboratory slips in order to place the current report in proper perspective.

A better method of reporting laboratory data is the use of flowcharts in which laboratory test results are listed in sequence. Although this

solves some problems, it creates others.

First, someone must copy the results from individual lab slips onto the flowchart. This process is time consuming and has the potential for copy errors, and the results may be illegible.

Second, the physician must scan the data to find abnormal results and attempt to recognize trends. Third, only a limited time span can be represented on each page.

An improvement over the hand-recorded flow sheet is the computer-generated flow sheet. The computer-generated flow sheet eliminates the need to copy data and is certainly legible.

In addition, some computer reports place an asterisk next to lab results that are above or below normal limits.

However, only a limited time span of information can be presented, and trends are not easily recognized until the test results rise or fall outside normal bounds.

Graphical presentation of laboratory data eliminates all the problems described above.

The physician can review all laboratory data for any selected time interval from seven to 365 days. By viewing a graph of the data, abnormal values can be rapidly located.

More importantly, trends in the data are much more obvious. Once a trend is identified, such as increasing or decreasing serum sodium, treatment can be modified to prevent an abnormal condition from developing.

Two keystrokes

At the U.S. Army Institute of Surgical Research, the physician can retrieve with two keystrokes the most recent seven days' values of six of the most important laboratory tests (sodium, potassium, blood urea nitrogen, creatinine, glucose and bicarbonate).

The graphs are displayed in color, which aids greatly in interpreting and differentiating the tests displayed on each graph.

The institute's system runs on a Digital Equipment Corp.'s VAX-11/780 running VMS using Regis graphics software from DEC.

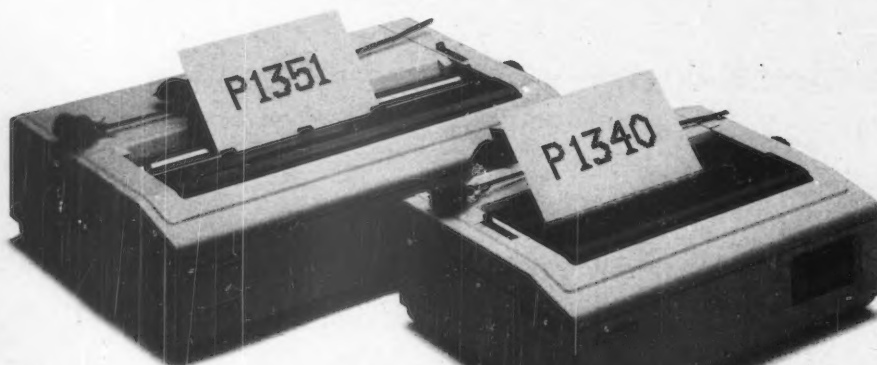
In addition to the standard chemistry profile that was described above, physicians can create custom graphs of all laboratory data. From a menu, the physician can select one or two tests per graph. Tests are displayed in different colors to aid recognition.

This method of data presentation supplements the standard tabular data display.

Once the physician notes something of importance on the graphics display, the option exists to view the data in numeric format for more detailed study.

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NEWS



CALENDAR

WEEK OF SEPT. 9

SEPTEMBER 10-11, DALLAS — **Introduction to Unix-Based Systems.** Contact: Stephen Blaha, Blaha Software, Inc., 50 Commonwealth Ave., Boston, Mass. 02116.

SEPTEMBER 10-11, TAMPA, FLA. — **Dbase II.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705. Also being held Sept. 12-13 in Fort Lauderdale, Fla., Sept. 17-18 in Denver and Sept. 24-25 in Washington, D.C., and Los Angeles.

SEPTEMBER 10-12, NEW YORK — **Automating the Office: A Tactical Guide for Success.** Contact: American Management Associations, 135 W. 50th St., New York, N.Y. 10020.

SEPTEMBER 10-14, OAKBROOK, ILL. — **Workload Analysis and Forecasting.** Contact: Institute for Information Management, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

SEPTEMBER 10-14, ANAHEIM, CALIF. — **Structured Design for Real-Time Systems.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held Sept. 24-28 in Boston.

SEPTEMBER 10-17, ST. LOUIS — **Intensive Cobol Series.** Contact: Center for the Study of Data Processing, Campus Box 1141, Washington University, St. Louis, Mo. 63130.

SEPTEMBER 10-21, PARSIPPANY, N.J. — **ANS Cobol.** Contact: Chubb Institute, P.O. Box 342, 8 Sylvan Way, Parsippany, N.J. 07054.

SEPTEMBER 10-26, ST. LOUIS — **Introductory Cobol.** Contact: Center for the Study of Data Processing, Campus Box 1141, Washington University, St. Louis, Mo. 63130.

SEPTEMBER 11-14, SAN DIEGO — **Computer Network Design and Protocols.** Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 45405, 6305 Arizona Place, Los Angeles, Calif. 90045. Also being held Sept. 18-21 in Washington, D.C.

SEPTEMBER 11-14, MONTREAL — **Moving with the Information Age.** Contact: Anthony Burry Young Ltd., Sixth Floor, 211 Yonge St., Toronto, Ont., Canada M5B 1M4.

SEPTEMBER 12-14, NEW YORK — **Telecommunications Manage-**

ment: Equipment Planning, Selection and Use. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

SEPTEMBER 12-14, PROVIDENCE, R.I. — **Data Communications Systems.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705. Also being held Sept. 17-19 in White Plains, N.Y., and Sept. 24-26 in Dallas.

SEPTEMBER 12-14, CHICAGO — **The Information Center: Concepts, Organization and Implementation.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

SEPTEMBER 12-14, COLUMBUS, OHIO — **Office Automation and the Technology Revolution.** Contact: Data-Tech Institute, P.O. Box 569, 386 Franklin Ave., Nutley, N.J. 07110.

SEPTEMBER 12-14, SAN FRANCISCO — **The IBM Personal Computer.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705. Also being held Sept. 12-14 in San Diego and Sept. 17-19 in Denver and St. Louis.

SEPTEMBER 12-14, WASHINGTON, D.C. — **Computer Performance Measurement and Capacity Planning.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

SEPTEMBER 12-14, ATLANTIC CITY — **The Second Annual East Central NCR Users Organization (ECUO) Conference.** Contact: Frank Whalon, NCR ECUO, P.O. Box 7, Dresher, Pa. 19025.

SEPTEMBER 12-14, NEW YORK — **Data Communications: Advanced Concepts, Products and Services.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

SEPTEMBER 12-14, RALEIGH, N.C. — **Local-Area Networks.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705. Also being held Sept. 19-21 in Columbus, Ohio.

SEPTEMBER 12-14, SAN FRANCISCO — **Fourth-Generation Systems and Languages.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

SEPTEMBER 12-14, ATLANTA — **Networking & Data Communications for Personal Computers.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

SEPTEMBER 12-14, PHILADELPHIA — **Unix.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92708.

SEPTEMBER 13-16, MINNEAPOLIS — **The National Conference to Examine the Impact of Microcomputer Technology for the Handicapped.** Contact: Closing the Gap, P.O. Box 68, Henderson, Minn. 56044.

WEEK OF SEPT. 16

SEPTEMBER 17-19, WASHINGTON, D.C. — **The Second Annual Conference on Administration and Control of Data Bases.** Contact: The Institute for Technology Integration Conference Registration Department, Sixth Floor, 1450 Broadway, New York, N.Y. 10018.

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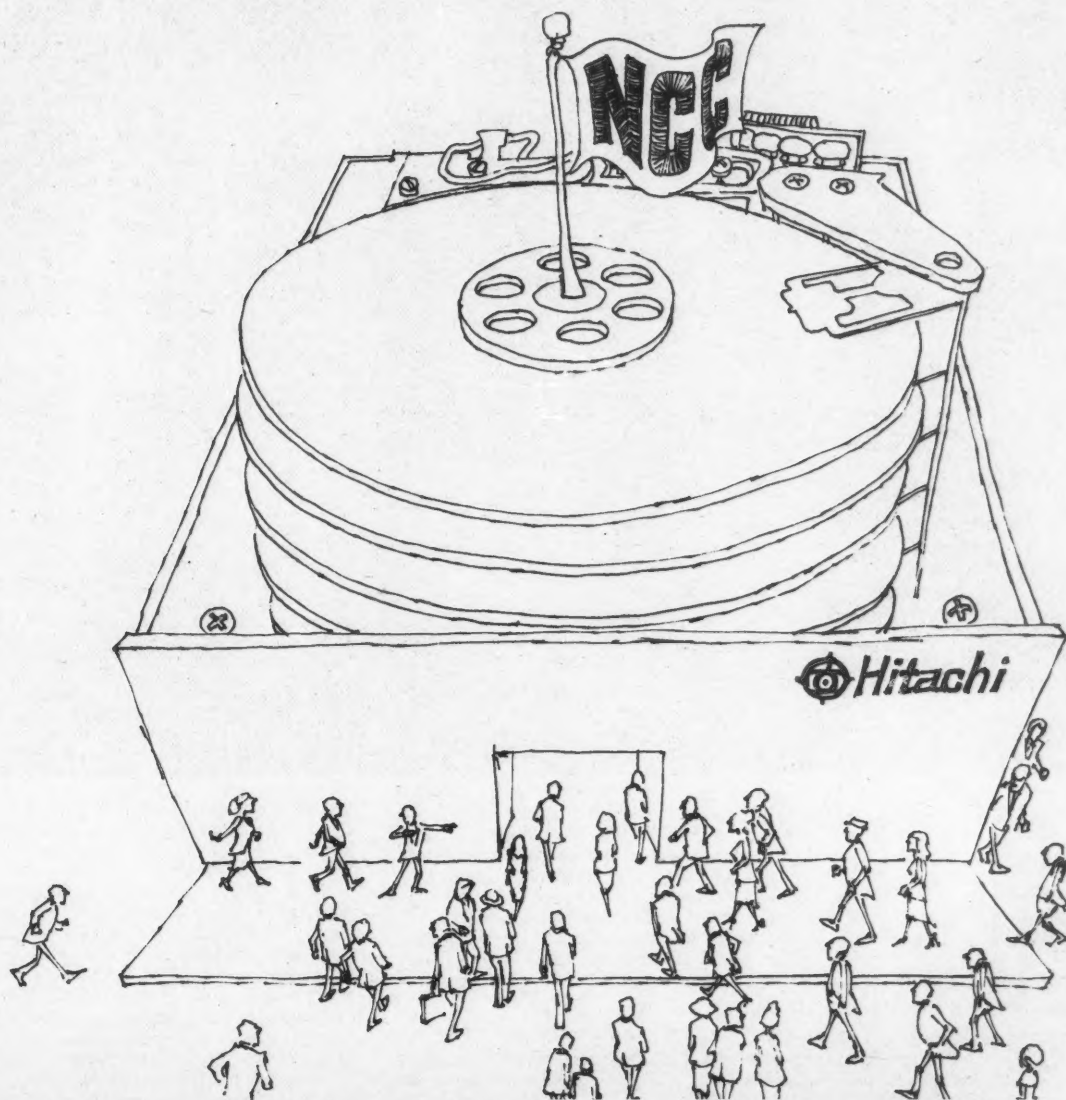
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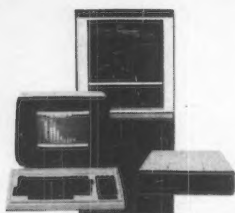
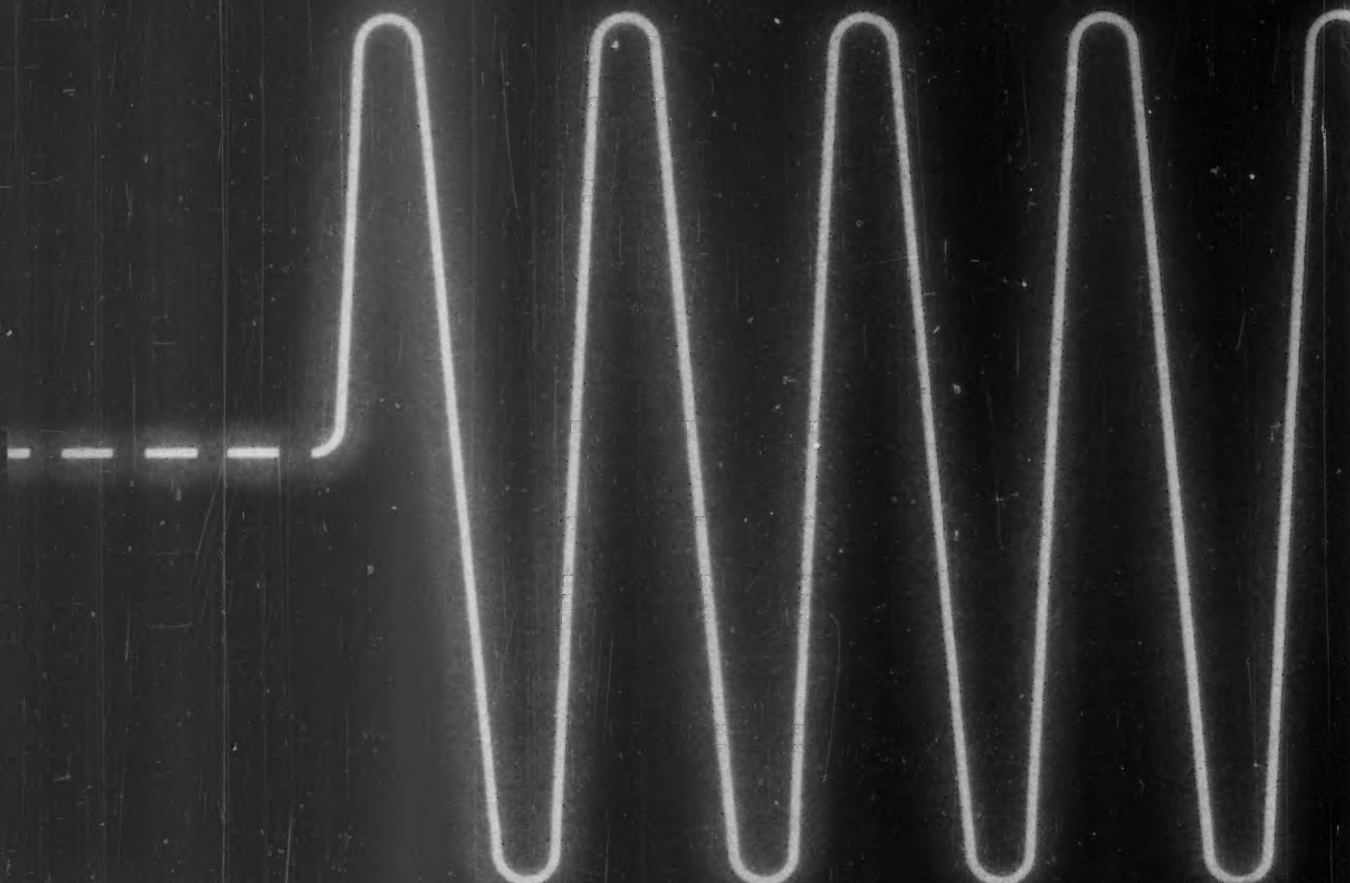
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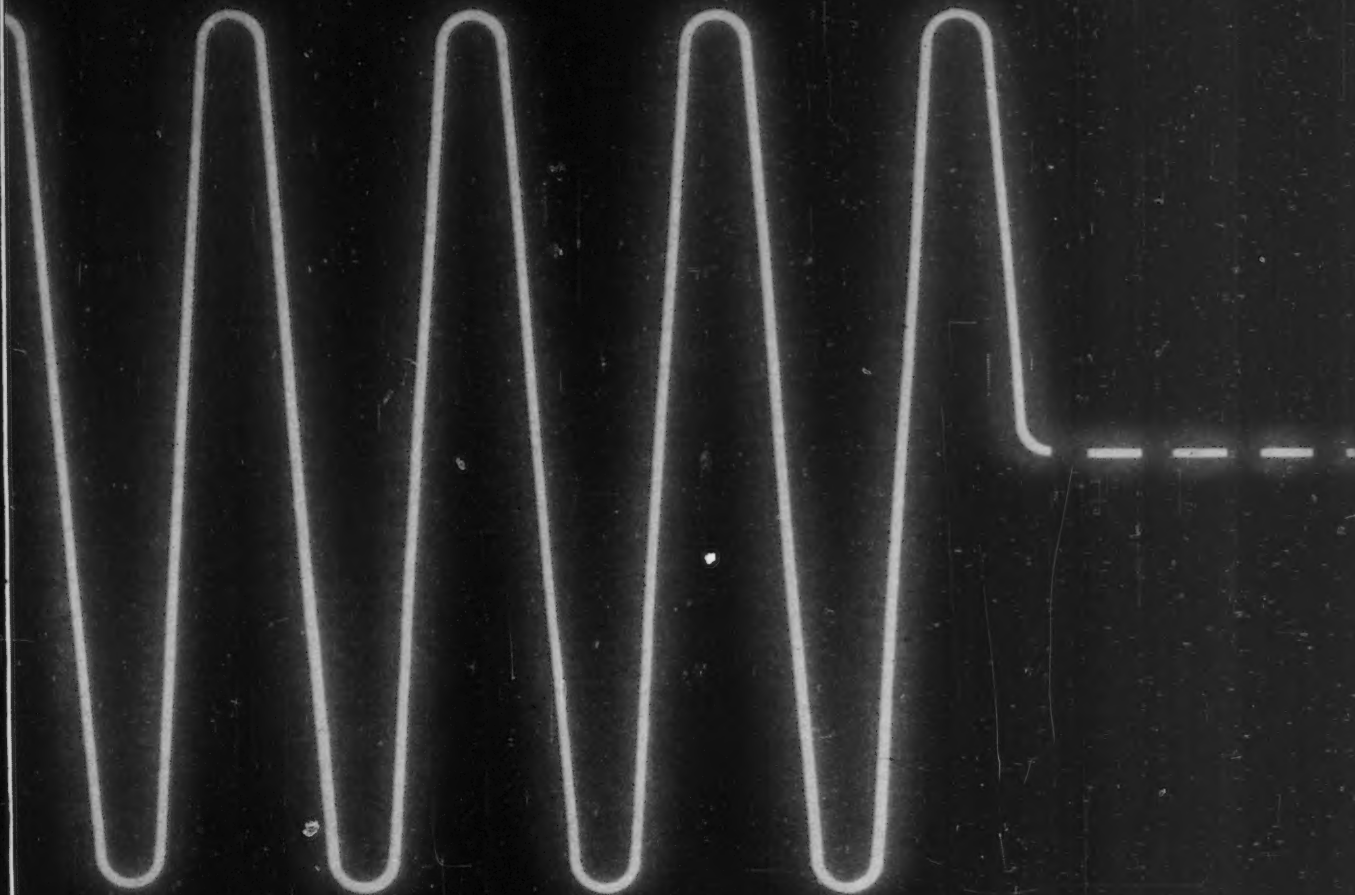
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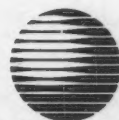
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EDITORIAL

Mainframe vendors' grades are out

It is encouraging that Datapro Research Corp.'s 1984 mainframe survey revealed that 96% of mainframe users felt their systems had lived up to their expectations. It is even more encouraging that 92% of those users were willing to recommend their systems to other users.

While sometimes criticized for polling too few users for each processor group, the Datapro surveys offer a sort of vendor report card, which over time, offers a fair glimpse of how an industry and its individual participants are performing.

In general, the marks are good. The Datapro surveys show the mature mainframe computer industry appears intent on refinement, making modest quality improvements each year. For example, when asked whether their systems did what they expected, 91% of the users polled last year said yes. This year, that number jumped to 96%. Likewise, in 1983, only 83% of users polled said they would recommend their systems to others; 91% were willing to make that recommendation this year.

It is interesting, too, that the vendors competing in the mainframe arena received very similar reports from users. There were no really dramatic discrepancies in user ratings from one vendor to the next. Even vendors with severe financial problems, like Magnuson Computer Systems, Inc. and IPL Systems, Inc., have managed to maintain high levels of user satisfaction.

In an industry segment so dominated by one vendor, it is important to note that almost all the competitors have proven themselves capable of providing products of at least equal quality as IBM, the industry leader. In fact, some IBM-compatible systems, such as National Advanced Systems, Inc.'s mainframe line, edged out IBM in overall user satisfaction.

The sad thing about numerical analyses of survey data is that someone always has to be in last place. This year, Honeywell received the lowest overall user satisfaction ratings, and the firm's DPS 8 processor was dead last in users' individual systems ratings. The sorry thing is Honeywell always seems to come out last on the Datapro surveys, a feat which, taken over time, indicates Honeywell has real problems keeping its users happy.

It is not that Honeywell systems are that much worse than anything else on the market. Considering the relatively few users Datapro contacts on each year's survey, it is easy to see how one vendor's products can be adversely affected by a few negative responses. It is the consistency with which Honeywell receives low user satisfaction scores that is disturbing.

Honeywell does appear to be trying to do something about its traditionally low scores. This year, the company reached an agreement with Japan-based NEC Corp. to provide mainframe computer systems. Perhaps over the next few years, the NEC deal will help move Honeywell out of the user satisfaction basement.

Such a turn of events will be a welcome change. With relatively few mainframe computer makers competing in the marketplace, the loss of Honeywell would be unfortunate.



LETTER

Service bureau: slap in the face?

T'Pell Wilson, who wrote "Enter service bureau; exit programming department" [CW, June 11], will be happy to learn that he is not alone. Furthermore, his projection of disaster for his company is probably correct.

After five years as DP manager with an organization that I had come to love and identify with, for which I provided exceptional facilities on an absurdly low budget, in which I educated users to try to destroy the myth of computer magic, to which I donated money and charged only half of my business travel (it was a nonprofit group), I too was shown to the door.

The organization eliminated the position of DP manager (as an "economy" move), bought new machines and turned the installation, implementation, training and conversion over to the vendor. With no knowledgeable management, you can guess what happened.

After little more than a year, the organization has only half the staff and the same number of

computers, but is spending almost twice as much on the facility. The doors to the computer center are locked. From what I hear, very little is working; promised conversions have not been done, and the machines are undersized for the requirements.

Not only did I lose my job, but everything I worked so hard to create for the organization has been destroyed. Darn right it hurts.

Emily G. Johnston
Westminster, Md.

Computerworld welcomes letters from its readers. Preference will be given to typed, double-spaced letters of 150 words or less; they may be edited for the purposes of clarity and brevity.

Letters should be addressed to Editor, Computerworld, Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

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VIEWPOINT

The leader's role in a successful DBMS effort



THE DATA
CENTER
John P. Murray

This is the fifth in an eight-part series.

Unless someone within the organization is willing to accept responsibility for the selection, implementation and continuing growth of the use of the data base management system (DBMS), the system's true potential will never be realized.

That is not to imply that without a DBMS champion, a data base system will not be selected or installed; there are far too many extant examples of such a circumstance to say it could not happen. However, the effective installation and continuing operation of a DBMS is too massive a task to expect it to occur spontaneously. If the DBMS environment is to succeed, there must be a strong and continuing commitment to that effort on the part of the highest level MIS person in the organization.

This person should lead the effort and should have the power to direct (and where required) force, the members of the MIS department to accept the use of the DBMS, and more importantly, the use of fourth-generation programming languages and the data dictionary. In addition, the MIS manager serves as the link to the organization's senior management and, therefore, is in a position to explain the function and benefits of the DBMS and to solicit the required support from that organizational level.

There are numerous examples of DBMS failures. For the purpose of this column, a failure would be a situation where a DBMS has been installed, but

where its use has been severely restricted. For example, as is often the case in a DBMS failure, the DBMS will be installed, one or two systems will be placed under it and that is the end of its use. In those organizations where two data base management systems are installed and the use of both is severely restricted, the failure is exacerbated.

Let's assume the MIS manager has developed

If the DBMS environment is to succeed, there must be a strong and continuing commitment to that effort on the part of the highest level MIS person in the organization.

the required fortitude to push the DBMS within the organization and has developed a clear vision of what the data base should be. This vision must fully appreciate the business potential of the DBMS and must realize that, in the future, the absence of a DBMS with its concomitant benefits to the MIS client community (the entire organization) may indeed mean the demise of the organization.

Whoever leads the DBMS effort, if it is to become successful, must develop and retain the proper appreciation of the value of the DBMS. The effort, to be successful, requires considerable fortitude and patience. Without a clear vision of the ultimate benefits of the DBMS, it becomes very easy to give in to pressures that will arise and to settle for less than that which can be delivered.

At times, in most organizations, the DBMS champion will have to develop an almost evangelical stance. The pressure to cut corners — to forget just one time about proper data analysis to get this

project up and running fast — will be hard to resist. Of course, compromise must be accommodated, but without the proper commitment to the DBMS, the end result will be less than it should be. Whoever leads a successful DBMS installation project must be prepared to do battle on several fronts.

The issues that must be presented to the organization's senior management — the cost of the DBMS package and the subsequent conversion of existing systems, the length of time required and the risk associated with the entire effort — present formidable concerns. Considerable marketing skills and persuasion will be needed to convince senior management of the efficacy of the movement to the DBMS environment.

There are certain to be any number of internal MIS battles. Which section of MIS controls the DBMS function? How will the data dictionary be used? Who will do the data dictionary work? What DBMS policies and standards will be set in place? How and by whom will the fourth-generation programming language be used? The transition of the systems and programming staff from Cobol to a fourth-generation programming language as the standard installation programming language can develop into a considerable political issue.

The concerns of the MIS clients also cannot be overlooked. The change in the way things will be done in the future by the MIS clients will cause concern. This idea of these clients accepting increased responsibility for some of their MIS work will not be met with joy in all client areas. The required approach here will be some combination of marketing and force; the degree of each required will depend upon the level of senior management support for the effort and the political skills of the DBMS champion.

The DBMS champion must be aware that progress can only be made in a series of stages and that those stages must be phased. That is, as the

See CHAMPION page 76

Murray is director of management information services for Rayovac Corp., Madison, Wis., and author of Management Information Systems as a Corporate Resource, published by Dow Jones-Irwin.

DP aspirants with unrealistic expectations



HUMAN
CONNECTION
Jack Stone

Having recently attended the graduation of a young collegian with a degree in computer science, I couldn't help but wonder what her feelings will be after experiencing the realities of this crazy business and comparing them with her high-flying job expectations. To be sure, there is and always will be considerable glamour, excitement and cash for most in our industry — in many cases, much more so than in any other line — although sometimes our projects wrap us so far around the axle that we have difficulty appreciating our good fortunes.

It is distressing, however, to find industry aspirants who, for some reason, truly believe that a handful of hours of programming a Timex 1000, designed by Sinclair Ltd., will qualify them for a job in the computer center. Talk about unrealism. William Delaney, president of Analysis and Computer Systems in Boston, has some incredible stories to relate on this subject:

"Many college students, and a lot of experienced professionals for that matter, are somehow misled into considering a data processing profession to be an easy thing — that they can quickly come in and learn it on the job."

Stone is an independent management consultant, educator and writer, specializing in DP human communications and personnel development, based in Washington, D.C.

Delaney's experience with employment situations is matched by that of his peers at other outfits.

In response to his company's advertisements for experienced personnel to work on complex, real-time communications network systems, in which were listed educational and technical qualifications, Delaney received many replies.

'Real, honest employment situations'

"Permit me to list some real, honest employment situations I've come across:

■ A nurse with eight years' nursing experience in the medical field got fed up, took an evening course in Basic and said she was ready to jump into our line of work. Can you imagine anyone applying for a registered nurse's job after taking a Red Cross course in first aid?

■ A ballerina, with 15 years' experience, injured her back and bought a home computer to idle her time away as she recovered. She liked it so much she applied to us for a programmer's position. Try going to a ballet company and asking for on-the-job training in the chorus until you learn how to become a ballerina.

■ Laid-off airline pilots and air traffic controllers apply to become programmers by trying to offer what they claim is applicable experience to the software business. They, too, want to learn on the job. I won't even attempt to project what would happen to any of us [if we] tried to [enter careers like] air traffic controlling or airline piloting by asking for on-the-job training," Delaney said.

There is also a great deal of time and expense involved in attempting to answer all the employment inquiries that pour in from totally unqualified applicants.

"It is our policy to answer any and all applications that contain a personal cover letter. A friend who is a vice-president for a very large company told me his division gets 10,000 applications per week. He figures that the company drops about \$100,000 annually in postage alone answering them.

"I recently received a letter from a young lady whose previous application had been rejected because, as she admitted in her second letter to me, she did not have the experience or qualifications as stated in our ads," Delaney related.

"Let me quote from her second letter: 'I am surprised at your lack of interest in my application. The current shortage of qualified people [of which she was not one] has allowed me to assume that at least a first interview is always granted.' Why should we waste her or our time when her initial resume showed no experience in any way related to our ads? Where did she obtain this impression? She is not alone, unfortunately."

Liberal arts graduates

Delaney has also had experience with liberal arts graduates who are deluded into thinking that the DP game is a snap.

"Many who graduate from colleges with non-technical degrees, like social studies, education or psychology, seem to believe a quick Cobol course will make them as fully qualified as those who studied physics, math or computer science. Why? Beats me, but this myth is commonly held," Delaney related.

"In conclusion, we really can't blame students for having unrealistic expectations about jobs in the software business, can we? Not if adult society has the same impression."

VIEWPOINT

Sick society



I was so upset at what I read that I didn't want to wait until I went to my office to have this typed. I am referring to the article "Stress in the DP Shop" [CW, June 11].

I quote: "When an executive dies or is debilitated by heart disease at age 45, his skills and knowledge are lost and wasted for the years between 45 and 65. That costs money to the company that trained him."

My God, what have we become? When our concern is not for the individual (or the family he left behind), but rather for the cost to the company, it is a reflection of a sick society.

J. R. Mahoney
Scranton, Pa.

Clever trickster?

If your staff intends to delve into the fraud- and delusion-prone area of psychics and alleged psychic powers as in the articles "Uri Geller puts his mind to computers" and "Computer crashes: A case of mind over matter?" [CW, June 11], then it better do a little homework. Geller was convincingly shown nearly a decade ago to be merely a clever trickster, and all evidence since then has only reinforced that view.

Essential reading would begin with *The Truth About Uri Geller*, by James Randi (Prometheus Books, 1982). This is a revised version of Randi's 1975 book, *The Magic of Uri Geller*. Randi revealed what Geller was up to, disclosing his methods of trickery, and practically no knowledgeable people have taken Geller seriously since then.

Martin Gardner's *Science: Good, Bad, and Bogus* includes several piercing critiques (including his classic "Geller, Gulls and Nitinol," originally published in *Technology Review*) and gives the necessary wider context. *The Psychology of the Psychic* (Prometheus, 1980), by David Marks and Richard Kammann, devotes more than a third of its text to observing and exposing Geller and explaining Gellerism as a case study in pathological science. My compilation, *Paranormal Borderlands of Science* (Prometheus, 1981) contains a six-chapter section critiquing Geller-type phenomena.

Kendrick Frazier
Albuquerque, N.M.

So now "academic parapsychologists" such as Dr. Robert Morris of Syracuse University and Dr. Robert Jahn of Princeton University are suggesting that some computer crashes might be caused by mind power [CW, June 11]. Well, should these gentlemen ever find a psy-

chic whose powers do not evaporate under careful scrutiny, we of the Bay Area Skeptics would be happy to provide computers for him to try to crash under properly controlled conditions.

Anecdotes, as sought from your readers by Morris, are worthless. Only the results of properly controlled experiments count for anything. If parapsychology is a science, as is claimed, it is the only branch of science that does not have a single repeatable

fact that can be demonstrated in the presence of critics.

As for Uri Geller, he is a humbug, a showman in the tradition of P.T. Barnum. Geller takes credit for anything that malfunctions in his presence, citing each instance as further proof of his mystical powers. His allegedly psychic metal bending is a parlor trick, which is duplicated nightly by magicians the world over.

Robert Sheaffer
San Jose, Calif.

Destructive bullying

The person who wrote the editorial "Life's bitter lessons" [CW, May 21] must be one of those who delights in unproductive bullying of those individuals and organizations who are our high-tech pioneers. All great people and ideas are pooh-poohed by the petty and jealous teardropers, who are only happy when they get to say "I told you so" after the fact.

I think that what Trilogy Ltd. proposes to do with its wafer-scale technology can still push the state of the art ahead. If there is, as the editorial suggests, "a sucker born every minute," I will gladly stand up and move to the head of the line with the other suckers who, in the process of taking a few steps forward, may have taken one step backward.

I am also surprised that *Computerworld* printed this editorial. It has always been

**I THOUGHT I
HAD TO CHOOSE BETWEEN
TOO LITTLE POWER PROTECTION
AND TOO MUCH COST.**



VIEWPOINT

my experience that the editorials in *Computerworld*, though controversial, have always offered some attempt at a solution or some sort of positive and constructive attitude. This one, however, is destructive.

When Trilogy does succeed, I wonder if the author of the editorial will have the courage to admit he was wrong and support Trilogy in its efforts.

Noel S. Wenkle
Long Beach, Calif.

Insightful interview

The In Depth article, "August Bequal, fighter for ethics" [CW, May 21], was one of the finest interviews I have seen in any journal or newspaper in a long time.

The questions and answers laid out so clearly the vital field of computer crime and suggest the broad contours of potential solutions

as well as further compounding problems.

Tribute should be paid not only to the staff of *Computerworld*, but also to Bequal for his candid and insightful responses in critical areas of public policy development and business strategic thinking. Thanks for an excellent job.

David Saari
Washington, D.C.



DPers vs. users

The facts that Jack Stone reports in his column "Work life-styles: Jet-speed DPers vs. snail-paced users" [CW, June 11] may be interpreted differently, and less flatteringly, from the viewpoint of the DPers.

The "high-speed perpetual motion" of programmers in large computer centers may be due to the fact that they are exempt from the constraints of accuracy to which

most users are subjected.

In many businesses, a worker who consistently made the sort of mistakes that occur in many programming environments would be fired for incompetence. The frenetic pace of the DP world may reflect a preference among its citizens for repairing casually introduced bugs rather than thinking deeply enough about the implications of what they are doing.

In this connection, it is so easy and quick for practitioners of the computing arts to change the form of a program that there is insufficient time for the implications of the change to become obvious through mature reflection.

For the DP professional, it is comforting that personal computer users become, as a result of their experiences with their own programming, more tolerant of failures in mainframe systems.

Stone's argument, carried to its logical conclusion, would suggest that physicians have no greater responsibility for effective care of their patients than does an unselected and untrained user of medical services with access to over-the-counter pharmacopoeia.

Karl G. Balke
Woodland Hills, Calif.



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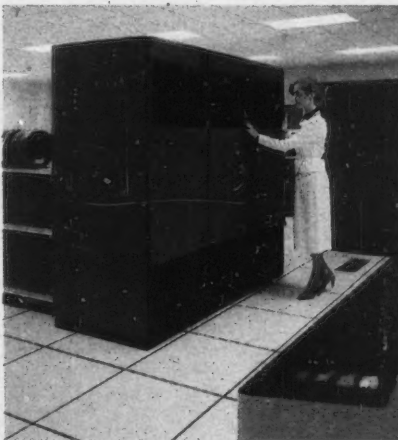
Traditionally, for moderate sized mainframe computer installations, it was a choice between two undesirables: too little power protection and too much cost. Voltage regulators or line conditioners left them vulnerable to flickers and power outages; uninterruptible power supplies provided all of the protection, but at too much cost.

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For the record

Your headline "Misleading attributions" aptly describes Jean E. Sammet's letter to you [CW, June 11] regarding my article on Cobol [CW, May 14]. I feel that I'm entitled to rebut.

First, Sammet is the only person I quoted regarding Cobol's initial definition because she has been the most conscientious and articulate of the pioneers to have spoken or written extensively on the subject. If any reader of my article concluded that Sammet was my collaborator, I echo her denial.

Second, the view I attribute to Sammet is not, contrary to what she says in her letter, a statement I said she'd made. I drew it from her paper, "The Early History of Cobol," and from her book, *Programming Languages*, in which she wrote: "... a number of significant ideas from Commercial Translator were taken over directly. ... It is perhaps unfortunate that in some cases the Short Range Committee chose deliberately to do things in a different way simply to avoid the accusation of domination by IBM."

Nowhere in my article did I suggest that Commercial Translator was not an important input to Cobol language development. Indeed, just as Sammet did in her letter, I cited only Commercial Translator and Sperry Corp.'s Flowmatic as inputs.

Richard L. Conner
San Francisco

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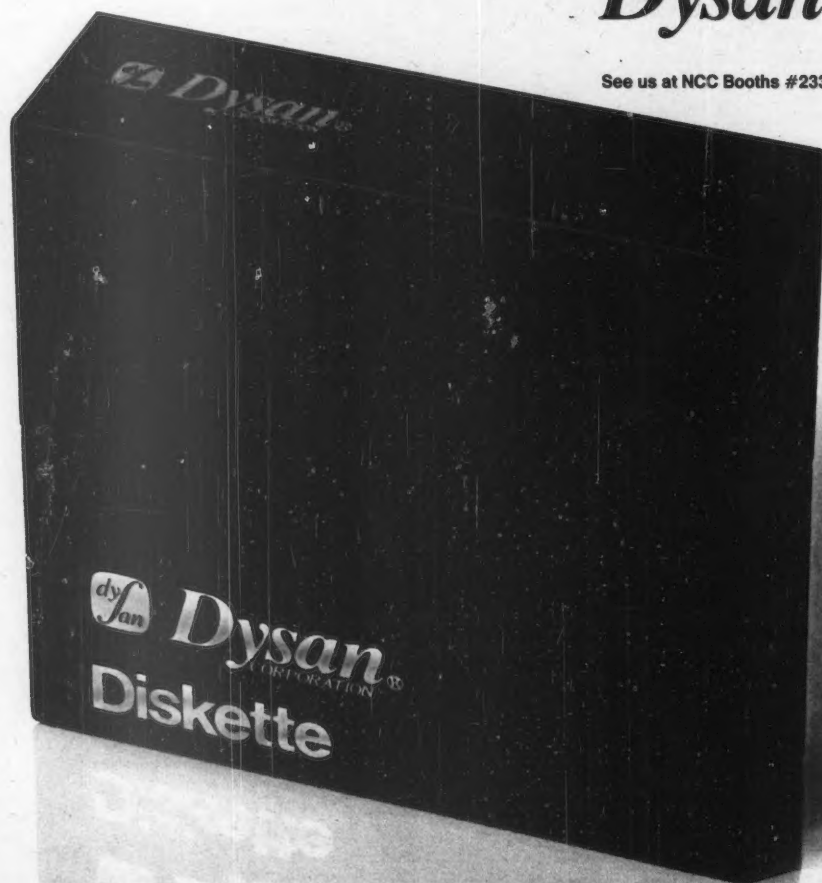
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VIEWPOINT

Bill exemplifies overreaction to computer crime



READER'S PLATFORM

Edward C. Saltzberg

The problem of computer crime is a serious and difficult one. To the extent that present statutes do not cover this new type of criminal behavior, some amendment of the present laws may be necessary. However, overreaction to the computer crime problem should be avoided.

Currently before the Massachusetts legislature is an act proposed by Gov. Dukakis (D-Mass.) titled, "An Act Relative to Crimes Involving the Use of Computers or Data Bases," which seeks to amend Chapter 266 of the General Laws (dealing with crimes against property). This proposal is a good illustration of such overreaction. It is a battery of shotguns where a rifle is needed. The statute is so broadly drafted that many innocent actions may fall within the scope of the statute.

One major problem with the act is the fact that the definitions it employs are over-inclusive. For instance, data base is defined as: "Any data or other information computed, classified, processed, transmitted, received, retrieved, originated, switched, stored, manifested, measured, detected, recorded, reproduced, handled or utilized by a computer, computer system, computer network or computer software."

Definition too broad

It is hard to imagine any piece of information that would not fit in this definition. "Computer" means any device that performs logical, arithmetic and memory functions. A digital watch or electronic ignition system in a car would fall within the definition of computer. The statute defines computer software as a series of instructions in human- or machine-readable form that control or otherwise influence a computer. Computer software, according to the act, might be the instructions that accompany a digital watch, the instructions to a gas station operator for running the motor vehicle inspection computer or a computer listing in a magazine.

The statute would make it a crime to access or use a computer or data base intentionally and without authorization. There is absolutely no criminal purpose for second-degree computer fraud or for some of the first-degree actions that the statute seeks to prohibit. Furthermore, there is no explanation of what "without authorization" means. Whose authorization must be obtained? The owner of the computer program, a rightful possessor of the computer program or the person who is actually selling or distributing the computer or data base? Does "without authorization" mean that authorization was requested and denied, or does it mean only that no one affirmatively authorized the defendant to use or access the computer or data base?

As can be seen from the above definition, a person at a newsstand who

picks up a copy of a computer magazine (or even the *Boston Globe*, for that matter) and reads it without authorization could be found guilty of second-degree computer fraud and fined up to \$5,000, imprisoned for up to one year, subject to civil damages up to triple the amount of actual damages plus attorney's fees and subject to mandatory court-ordered restitution.

Even if the definitions were made much narrower in scope, there are many other problems with the proposed statute. For instance, Section 7 of the act provides that "prosecution pursuant to this act shall not prevent any prosecutions pursuant to any other provision of the law, where

such conduct also constitutes a violation of such other provision." At best, such a provision is ambiguous; at worst, the provision may raise serious double jeopardy problems.

Another problem with the proposed act is the mandatory restitution provision. The act requires a court to order restitution unless there are extraordinary reasons for not doing so. What are the standards that a judge is to use when determining whether to order restitution? Must the injured party first prove the fact and amount of its damages? Who is an injured party? Do the traditional rules of procedure and evidence apply? How does the mandatory restitution provision mesh with the tre-

ble damages provisions? None of these questions are answered in the statute.

Similarly, Section 9 of the act provides that the hearing on the criminal action may be consolidated with the hearing on the civil action arising out of the same underlying acts. Different standards of proof apply in criminal and civil actions. How is that to be handled in a consolidated hearing? How is the judge or jury to differentiate the two standards of proof in reaching multiple types of verdicts on the same facts?

Perhaps this act is proposed solely as a means of provoking discussion rather than as a serious attempt at enactment.

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Saltzberg is an attorney with the law offices of Bigelow & Saltzberg in Woburn, Mass.

VIEWPOINT

Strategies for purchasing from a troubled company



**READER'S
PLATFORM**
Robert W. Hassett

In September of 1983, Osborne Computer Corp. filed for relief under Chapter 11 of the Federal Bankruptcy Act. Osborne failed because of problems unique to its product and its marketing. Nevertheless, the filing had a chilling effect on the capital market and consumers in the computer industry. It created some gross exaggerations about how IBM would drive every other hardware manufacturer out of the market; even though experience showed that AT&T could not keep the telephone industry to itself.

Nevertheless, the Osborne case did highlight that big problems exist for companies in the computer industry. Potential customers need insight into strategies they should consider before making a purchase of equipment from a troubled company — or, indeed, from a company already protected under Chapter 11.

A company in financial trouble has at least six options:

- To continue to operate until its fortunes change or the phones are cut off.

- To seek additional capital or financing — very difficult to obtain unless potential investors or lenders are absolutely convinced that the product development and marketing strategies are sound and that success is around the corner.

- To seek a merger with a larger company convinced of the worth of its products.

- To work out a deal with its creditors to have them hold off on their claims to allow the company to turn itself around. This is known as the "what-have-they-got-to-lose" approach.

- To file for relief under Chapter 7 of the Federal Bankruptcy Act.

- To file for relief under Chapter 11 of the Federal Bankruptcy Act.

A Chapter 7 bankruptcy is a stan-

dard liquidation — what most people know of as a bankruptcy. The company ceases operations, and a trustee distributes the assets as provided by the applicable rules. Certain debts are given priority, including certain advanced payments for goods not delivered and services not provided, certain wages, taxes and attorney fees for the bankruptcy. In the unlikely event any assets remain after the payment of priority debts, the remaining creditors, known as "general unsecured creditors," are paid pro rata to the extent assets are available.

Temporary problems

Chapter 11 bankruptcies are designed for companies having temporary cash flow problems and that expect and have specific plans for rehabilitation. Upon filing a Chapter 11 proceeding, every action against the debtor, which may include lawsuits, foreclosures and repossessions, are automatically stopped until further order of the judge. The debtor corporation is given 120 days to propose a plan for satisfying the company debt and 180 days to obtain the creditor vote necessary to have the plan approved.

Both time periods run from the date the Chapter 11 petition is filed. The judge has the right to shorten or lengthen these time periods. The plan may involve reducing and delaying payment of debts. The more the debts

are reduced and payment delayed, the more likely the company will be able to meet the terms of the plan, but the less likely the company will be able to get the necessary number of votes of the creditors to have the plan approved.

Chapter 11 involves substantial legal and accounting expenses. Instead of working on sales and marketing, top management is tied down in the day-to-day court activities, including preparing documents, attending court hearings, giving testimony and soliciting plan acceptance.

Rarely successful

For these reasons, and because of the injury to the company's reputation caused by the filing, Chapter 11 is rarely successful when the problem includes the lack of current substantial sales. Whether this rule will hold true in the computer industry is another question, as the determination, intelligence and blind faith of some of the people in this business have on many occasions overcome severe financial problems that would have probably been fatal in other industries.

In addition, when the company's problems result from such things as a large lawsuit, foreclosure for an inadvertently late payment or an unexpected cash flow problem caused by delayed payment by a large customer, a Chapter 11 filing will frequently lead to restoration of the company's

financial health. A potential customer may be able to learn what happened by examining the court filings, attending scheduled hearings and speaking with the company's attorneys. When a substantial purchase is being considered, review by the customer's own attorney or accountant is advisable.

Should a customer purchase products from a company protected under Chapter 11? Warranties for computer hardware typically run for 90 days. The value of those warranties will be lost if the company does not remain in business long enough to meet the provisions of the warranties. In addition, if a company fails, it will obviously not produce any enhancements, peripherals or related software for those products. Other companies will also not produce such items except to satisfy markets for similar products of companies not in trouble.

These risks may be more than offset by a substantial drop in the price of the products. In addition, the company may survive the Chapter 11 and reestablish itself in a stronger position than before the filing.

Let's just say that when a customer knows a company is having financial difficulties, and the initiation of a Chapter 11 proceeding certainly provides such knowledge, the customer needs to think long and hard about purchasing products from that company. ‡

CHAMPION from page 71

effort moves along, any one of the three groups affected — senior management, MIS clients or members of MIS — will be at a different stage of evolution. Moving through each phase will mean that each group will have to be brought up to speed. To that extent, the mission of the DBMS is never ending.

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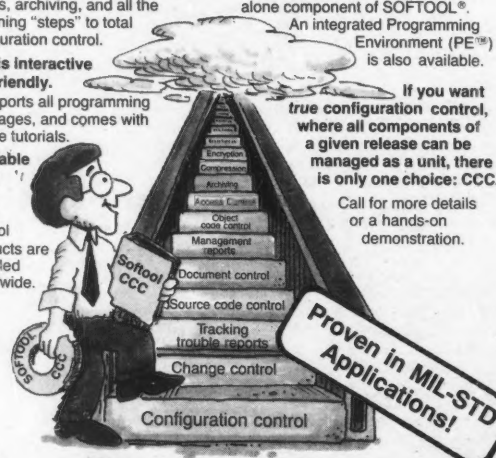
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SOFTWARE & SERVICES

Micro-mainframe link warrants careful analysis

By James R. Craner
Special to CW:

Many corporate DP managers are now considering the acquisition of a microcomputer-to-mainframe link product in order to allow greater access to mainframe data base information by their company's micro users. Although the pressure to implement a product quickly is often intense, caution and deliberation are needed.

Analysis of the various offerings should fall to the corporate DP manager. Corporate DP has concerns over issues such as data security, performance, implementation, software compatibility and user support. End users can be best involved in delineating the business goals they want to

Craner is assistant director of corporate development at First Concept Technologies, Inc. in Rochester, N.Y.

achieve before specific link products are selected for further technical review.

The various micro-to-mainframe link products vary widely in scope, capability and features. Some are simply hardware links that provide for terminal emulation, while others permit the transfer of complete files between linked devices. The most advanced products translate user requests and pass them to the mainframe data base management system (DBMS) to allow direct access to data base information while ensuring controlled access and data integrity.

Products that simply enable full file transfer may prove problematic when implemented. Most end users do not need or want an entire file transferred to their micros. They need a subset of the file, with individual records selected based on their criteria. Another problem is that the sheer size of most mainframe files quickly out-

strips the storage capacity of a typically configured micro.

The deeper problem is that the full file transfer approach is often inefficient for both the user and the DP center. Most DBMS files, regardless of their size, cannot be transmitted simply to the end user in their production form. The DP center must first write an extract program to create a flat sequential disk file. These often include hard-coded selection criteria to accomplish a selective record extract. Even after the file has been transferred, it must often be converted again for use on the micro.

Here are the essential characteristics of a complete micro-to-mainframe link product:

- It should allow the micro user to access mainframe files directly, without the need for a separate data extract step. This

See LINK page 92

■ Hewlett-Packard Co. has enhanced its data dictionary for the HP 3000 super-mini/78

■ Another micro-mainframe link, this one for IBM's VM/CMS operating system, has been unveiled by Linkware Corp./78

■ Oxford Software Corp. has introduced a real-time microcomputer-mainframe link for IBM hardware/79

■ A new version of the Telon application generator is available from Christensen Systems, Inc./79

Users offer their praise, criticism in recent survey of IBM CICS sites

By John Gallant
CW Staff

BERKSHIRE, England — A survey of IBM CICS users cites reliability and flexibility as two key advantages of that teleprocessing monitor. But the system is plagued, users complained, by storage violation problems and nagging security failures.

Those findings are outlined in a 90-page user study titled "CICS in Practice," released recently by Xephon Technology Transfer Ltd. here. The report is based on questionnaire responses from 105 users of CICS, IBM's most widely installed teleprocessing monitor.

When asked to comment on the major strengths of CICS, users most frequently responded that the system is reliable (19%). CICS was perceived as flexible by nearly as many respondents, and almost 15% of the users said they were pleased by both the quality and the quantity of compatible non-IBM software available for use with CICS. A number of users said they expected many new products to be written

for CICS, which was described as an industry standard.

Users also said that the system's PL/1 command-level structure is relatively easy to learn and that CICS itself is well supported by IBM. CICS' efficient CPU usage was touted as a strong point by other users, and the customization options supported by Big Blue to allow users to tailor the system were seen as a real benefit. Among other strong features of CICS were its debugging facilities and reentrant programs, the perceived ease with which it handles IBM VSAM files and the similarity of the command-level structure to Cobol.

On the debit side of the CICS ledger, users cited storage violations and the lack of storage protection between tasks as the major weakness of the system (18%). Another 17% said on-line updating facilities were needed because reloading of modified tables is slow and represents a large system overhead. Users also complained of high resource usage, mainly in terms of excessive storage, security problems and a

See CICS page 92



MSA to refocus around 'Peachlink'

Management Science America, Inc. (MSA) has a busy year coming up. The vendor plans to introduce a wide variety of new products, but this time with a greater emphasis on micro-mainframe links. In fact, the new products will be built around its Peachlink communications software, which MSA plans to unbundle and make the cornerstone of the company's new direction, MSA said.

MSA revealed its plans to 3,000 users who recently gathered at the annual Interact session in Atlanta.

Currently, Peachlink comes as part of the company's integrated Executive

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SOFTWARE & SERVICES

Linkware offers IBM mainframe-Personal Computer link

WALTHAM, Mass. — Linkware Corp. has introduced Linkware:Information Server (L:IS), a link between IBM mainframes in IBM's VM/CMS environment and IBM Personal Computers.

According to a spokeswoman, L:IS runs as an application under VM/CMS and acts as a virtual server that facilitates the transfer of information between different machine types. The system provides a staging area for data, allowing users to access and transfer information. It is also said to secure information by

matching files to user identifications for clearance.

L:IS consists of two components, the spokeswoman said. The VM User Connection portion resides on the mainframe and gives on-line VM/CMS users concurrent access to files. The PC Connection component resides on the micro and allows uploading and downloading of text and data files between the micro and L:IS. This portion is said to handle protocol conversion, file reformatting into Software Arts, Inc.'s Data Interchange Format and comma-delimited

format, and it supports terminal emulation for IBM 3278 and 3101 terminals.

The PC Connection portion is said to support micros running under IBM's PC-DOS, Microsoft Corp.'s MS-DOS and Digital Research, Inc.'s CP/M 86 operating systems, including the IBM Personal Computer and compatible micros, Digital Equipment Corp.'s Rainbow and Lee Data Corp.'s micros.

L:IS is said to provide error detection and correction capabilities for the transmission of error-free binary

data. The system alerts the receiving computer to incomplete or improper data transfers and automatically retransmits the data or files. An audit trail tracks file transfers in both directions for auditing or billing and keeps a permanent record of transactions for management reporting.

The VM User Connection and the PC Connection portions together are priced at \$25,000. Software for the Personal Computer costs \$350/copy, with quantity discounts available from Linkware, 77 Rumford Ave., Waltham, Mass. 02154.

'Soft-Switch' gets interface

KING OF PRUSSIA, Pa. — Integrated Technologies, Inc. has announced the Soft-Switch Interactive Interface (SSI), which the vendor described as an enhancement to its Soft-Switch multivendor document control system.

According to a spokesman, SSI provides Soft-Switch services to users accessing IBM's TSO through any type of IBM terminal or through an IBM Personal Computer using the Integrated Technologies PCSwitch microcomputer-to-mainframe link software.

The SSI system is similar to conventional electronic mail systems, ac-

cording to the vendor.

SSI also explicitly recognizes different types of word processor documents and will translate from one word processor coding system to another transparently to the user, according to the Integrated Technologies spokesman.

SSI executes as a TSO application and supports the IBM MVS version of Soft-Switch.

The core Soft-Switch module is priced at \$10,000, and SSI is priced at \$15,000.

Integrated Technologies is at 200 N. Warner Road, King of Prussia, Pa. 19406.

HP enhances 'Dictionary/3000'

PALO ALTO, Calif. — Hewlett-Packard Co. has announced a series of enhancements to its HP Dictionary/3000 data dictionary.

According to a spokesman, the enhanced HP Dictionary/3000 can improve programming speed and reduce debugging problems for programmers using the HP 3000 business computer. The software serves as a central source of definition and location information, eliminates the need for re-entry of data and avoids ambiguities due to multiple element names.

The system was formerly confined to use with HP Rapid/3000 software products, but can now be used in Pascal and Cobol programming.

HP Dictionary/3000 also has been linked to HP's Inform/3000 and Report/3000 reporting tools and to the HP Materials Management/3000 and Production Management/3000 systems. The first copy of HP Dictionary/3000 is priced at \$5,000. Current users will receive the enhancements free. HP is at 3000 Hanover St., Palo Alto, Calif. 94304.

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SOFTWARE & SERVICES

Data transfer system debuts

HASBROUCK HEIGHTS, N.J. — Oxford Software Corp. announced a data transfer system that allows the IBM Personal Computer and compatibles to download and upload files in a real-time environment with an IBM mainframe host.

The product, called PC Mainframe, reportedly requires no special programming and provides the capacity to extract, average, summarize, reformat and transmit selectively records and fields from mainframe files to the Personal Computer.

It reportedly also allows users to have centralized control over file transfers, including authorization capability, and provides a central library to allow users to store files from the Personal Computer on a mainframe file.

Its security features reportedly include multiple passwords and a ban on access to CICS.

PC Mainframe also reportedly automatically reformats data being transferred from the mainframe to formats for spreadsheets, data bases, text and binary data.

PC Mainframe operates in conjunc-

tion with the IBM CICS teleprocessing monitor and IBM Personal Computers, Personal Computer XT's and compatibles, incorporating Digital Communications Associates, Inc.'s Irma terminal emulator board, an asynchronous communications card or an IBM 3270 protocol converter.

PC Mainframe is priced at \$9,000 for its DOS version and \$12,000 for its OS version, each of which will support eight Personal Computers. A charge of \$300 is made for each additional Personal Computer when more than eight are added to the system.

Additional information is available from Oxford Software, which is located at 174 Boulevard, Hasbrouck Heights, N.J. 07604.

Christensen enhances 'Telon'

QUINCY, Mass. — Christensen Systems, Inc. has announced a series of enhancements to its Telon applications development system for IBM IMS/DC and CICS environments.

According to a spokesman, Release 1.2 of Telon features enhancements that add to the functionality of the Telon Design Facility (TDF) and other components of the system. The TDF has been improved to better capture external design characteristics, which can be used to specify Cobol or PL/1 programming statements that can be interleaved into the generated program to perform additional functions, the spokesman said. Other enhancements reportedly include a more user-friendly front-end system

in the TDF, support for all screen sizes and a full screen editor.

The Telon system consists of a screen design facility that allows a programmer to paint a screen, capture design characteristics and enter additional programming statements; an integrated applications generator, which uses the high-level design statements from the screen facility; and an interactive test and debug facility that allows prototyping or application testing under the IBM TSO environment.

Release 1.2 of Telon is priced at \$90,000 for the IMS environment and \$50,000 for the CICS environment.

Christensen Systems is at One Heritage Drive, Quincy, Mass. 02171.

SYSTEMS SOFTWARE

M. BRYCE & ASSOCIATES, INC.
Pride-ASDM Release 7.0.0

M. Bryce & Associates, Inc. has announced Release 7.0.0 of its Pride-Automated System Design Methodology (ASDM). The new version reportedly includes a number of enhancements that improve the program's speed and performance.

Release 7.0.0 includes an interactive facility that replaces four previous modules — Search Data Base, Interactive Component Display, Interactive Data Entry and Interactive Display — to improve the software's efficiency.

An improved data base reorganization subsystem has been added to the program's Information Resource Manager. Release 7.0.0 also includes enhancements to the product's Automated Instructional Materials that includes narratives and instructions for system design, data base design and project management.

The program runs on a variety of minicomputers and mainframes, including IBM, Digital Equipment Corp., Honeywell, Inc., Hewlett-Packard Co. and Data General Corp. Its price is \$80,000.

M. Bryce & Associates, 1248 Springfield Pike, Cincinnati, Ohio 45215.

TRIMBLE DATA SYSTEMS
Transfer

Trimble Data Systems has introduced a mainframe-to-microcomputer interface for use with SAS Institute, Inc.'s SAS data management and analysis program that reportedly performs data transfers between IBM mainframes and microcomputer application software such as Lotus Development Corp.'s 1-2-3, Visicorp's Visi Calc and Microsoft Corp.'s Multiplan.

Transfer is said to enable the user to transform mainframe-resident SAS data sets into sequential files.

Continued on page 80

Forget all the dirty stories you've ever heard about in-house COM printing.

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BELL & HOWELL
COM DIVISION

SOFTWARE & SERVICES

Continued from page 79

which, when downloaded to a microcomputer, can be used directly by the microcomputer's application packages.

Transfer is priced at \$495 for a first-year license and \$75 for each additional year.

Trimble Data Systems, 10706 Wynkoop Drive, Great Falls, Va. 22066.

MATLEN SILVER GROUP, INC. Dora

The Matlen Silver Group, Inc. has announced its Dynamic On-line Report Aid (Dora), which is said to provide users with a report management system for IBM CICS environments.

According to a spokesman, Dora assists in the management and control of all on-line reports. It eliminates the need for device-dependent code, provides security to protect sensitive data and features automatic restart and recovery facilities to handle hardware and CICS failures.

Dora is available for IBM OS and DOS environments with CICS/VS Releases 1.5 and above using IBM's Basic Mapping Support. It costs \$8,800/site with a \$1,000/site annual maintenance fee.

Matlen Silver Group, Suite 306, Littleton Plaza II, 119 Littleton Road, Parsippany, N.J. 07054.

INFORMATICS GENERAL CORP. Shrink/IMS Release 3.4

Informatics General Corp. has introduced Release 3.4 of its Shrink/IMS file-compression package, which is said to use 50% less IBM Local Storage Option (LSO) or Common Services Area (CSA) than previous Shrink versions.

Shrink is a file-compression/encryption program tailored to IBM's IMS/DC and CICS environments. Release 3.4 reportedly achieves CSA and LSO savings through advanced compiler techniques, helping to economize IMS/DC usage.

Available for immediate delivery, Shrink/IMS sells for \$39,000 and includes a fully transparent interface to compressed data bases as well as subroutines for use with conventional access methods.

Informatics General, 21031 Ventura Blvd., Woodland Hills, Calif. 91364.

INDUSTRIAL MANAGEMENT SYSTEMS CORP. Menupro

Industrial Management Systems Corp. has announced Menupro, a combined menu and command processor for users of the Hewlett-Packard Co. HP 3000 computer.

According to a spokesman, Menupro can be used to control application packages, create customized menu screens and aid in software conversions.

It reportedly can handle an unlimited number of users and can control operation and access to any combination of interactive and noninteractive applications.

The spokesman said Menupro aids in converting software designed for other computers to the HP 3000 and in the integration of purchased and in-house-developed systems.

Menupro costs \$900.

Industrial Management Systems, P.O. Box 12, 3 W. Stimson Ave., Athens, Ohio 45701.

STORAGE TECHNOLOGY CORP. Sybercache Statistical Product

Storage Technology Corp. has announced a proprietary software package designed for use with its 8890 Sybercache Intelligent Disk Controller.

According to a spokesman, the Sybercache Statistical Product (SSP) is a licensed program designed to help IBM OS/VS operating system users monitor the performance and status of disk subsystems controlled by the 8890 system. Using microcode intelligence, the Sybercache unit collects performance statistics about its own operations. Those statistics are made available to the user through the SSP software.

The spokesman said SSP tells users what percentage of their I/O operations is satisfied by data in the

high-speed cache and helps them evaluate how effectively they are utilizing the cached subsystem. The information reportedly helps users ensure optimal performance from the disk subsystem. SSP is priced at \$1,000.

Storage Technology, 2270 S. 88th St., Louisville, Colo. 80028.

JFN SOFTWARE Evolve Macro to Command

JFN Software has announced an IBM CICS migration aid that reportedly allows CICS macro-level applications to be converted to command-level interfaces.

According to a spokesman, the Evolve Macro to Command package eliminates the task of manually recording macro-level source calls to their command-level counterparts,

saving time in the migration process. The system will reportedly convert applications written in Cobol and assembler and will also handle IBM DL/1 calls for data base users.

Evolve Macro to Command reportedly can convert entire libraries of individual member programs and will document calls that are no longer supported in command level. It is priced at \$5,000 and will run on any IBM 370-type CPU with storage of at least 1M byte, the vendor said.

JFN Software, P.O. Box 693, Rialto, Calif. 92376.

CLYDE DIGITAL SYSTEMS, INC. Audit

Clyde Digital Systems, Inc. has announced the release of a software security and documentation tool called Audit for Digital Equipment Corp.'s

At long last, there is the business mind with the business system, effortlessly. Software so totally different and uniquely intelligent that it can create and carry through complex projects by itself. Extraordinary software with the capacity to adapt to a range of users' abilities, and grow in sophistication as their needs expand.

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The Smart Software System is currently available for the IBM PC/XT and compatibles. In Kansas, call 913-383-1089. © 1984 Innovative Software, Inc.

SOFTWARE & SERVICES

VAX-11 series of minicomputers. Audit reportedly creates a complete audit trail of all activities at a given terminal.

It can be assigned to monitor any terminal or number of terminals on the system and can also monitor dial-in lines, the vendor said.

It reportedly does not affect any job being run, and the monitored user cannot detect its presence.

Audit is priced at \$980.

Clyde Digital Systems, Building 3, 3707 N. Canyon Road, Provo, Utah 84604.

DATA SYSTEMS FOR INDUSTRY Data Collection Interface

Data Systems for Industry has announced the Data Collection Interface (DCI), which serves as a pathway between Intermec Corp.'s

bar-code equipment and application transactions on Hewlett-Packard Co.'s HP 3000 and Stratus Computer, Inc.'s Stratus/32 computers.

The DCI package manages all I/O between Intermec equipment and its host computer. Features include transaction buffering, formatting and spooling for bar-code label printing, logical-to-physical device mapping and transaction file definition of prompts and validation criteria.

It costs \$4,500 for an object-code license.

Data Systems for Industry, 3942 Cerritos Ave., Los Alamitos, Calif. 90720.

IVAN SOFTWARE, INC. Ivan-V/OLTDS

Ivan Software, Inc. has announced an interface that allows users of NCR

Corp.'s NCR/VRX operating system with NCR's V/OLTDS to access Ivan Software's Ivan-Edit full screen text editor and Ivan-Lib data file library.

V/OLTDS is a communications driver that allows users of dedicated terminals access to any on-line program in a system, a spokesman said.

The price of the Ivan-V/OLTDS interface is \$3,000.

Ivan Software, 120 N. Keowee St., Dayton, Ohio 45402.

CONSUMER SYSTEMS CORP. Editryte

Consumer Systems Corp. has announced a tool for the data edit function that removes editing logic from applications programs and places it in user-maintainable files. Editryte is designed to run in IBM and compati-

ble mainframe environments under IBM's OS or DOS operating systems.

Editryte allows nontechnical users to create and standardize editing rules in a user-oriented language. This reportedly eliminates the necessity of waiting for technical staff assistance to change application program code.

The Editryte software package is priced at \$21,000 for the OS version and \$16,000 for the DOS version.

Consumer Systems, 1100 31st St., Downers Grove, Ill. 60515.

PRODUCTIVITY AIDS

ROBERT E. NOLAN CO. Proper; Spers

Robert E. Nolan Co. has announced two software products designed to increase and report on the productivity and effectiveness of systems programmers and batch production systems.

The Programmer Productivity Evaluation and Reporting System (Proper) is designed for IBM mainframe users utilizing IBM's OS operating system. It reportedly combines qualitative, manually collected personnel data with information generated by IBM's System Management Facility (SMF) to produce programmer evaluation reports.

The reports show various cross sections of information, including resource utilization; compile or assembly statistics; abnormal job terminations; individual profiles or tendencies; and relative rankings by team, division and company, the vendor said.

The System Productivity Evaluation and Reporting System (Spers) also utilizes SMF to report on the performance and reliability of production batch software. Spers produces reports that show system profiles that can be used to identify trends in problem jobs, resource utilization and scheduling, the vendor said.

Proper and Spers are priced at \$10,000 each.

Robert E. Nolan, Suite E-2, 8035 Madison Ave., Citrus Heights, Calif. 95610.

RUBEL SOFTWARE Blox Graphics Builder

Rubel Software has introduced Blox Graphics Builder for use on Digital Equipment Corp.'s VAX-11 computers under DEC's VMS or the Unix operating system.

Blox permits users to prototype and develop graphics applications rapidly and interactively, according to the vendor.

Blox reportedly allows users to create graphics applications by drawing the applications' icons and screen layouts. Users can also use Blox automatically to link the application code to defined screens, menus and events.

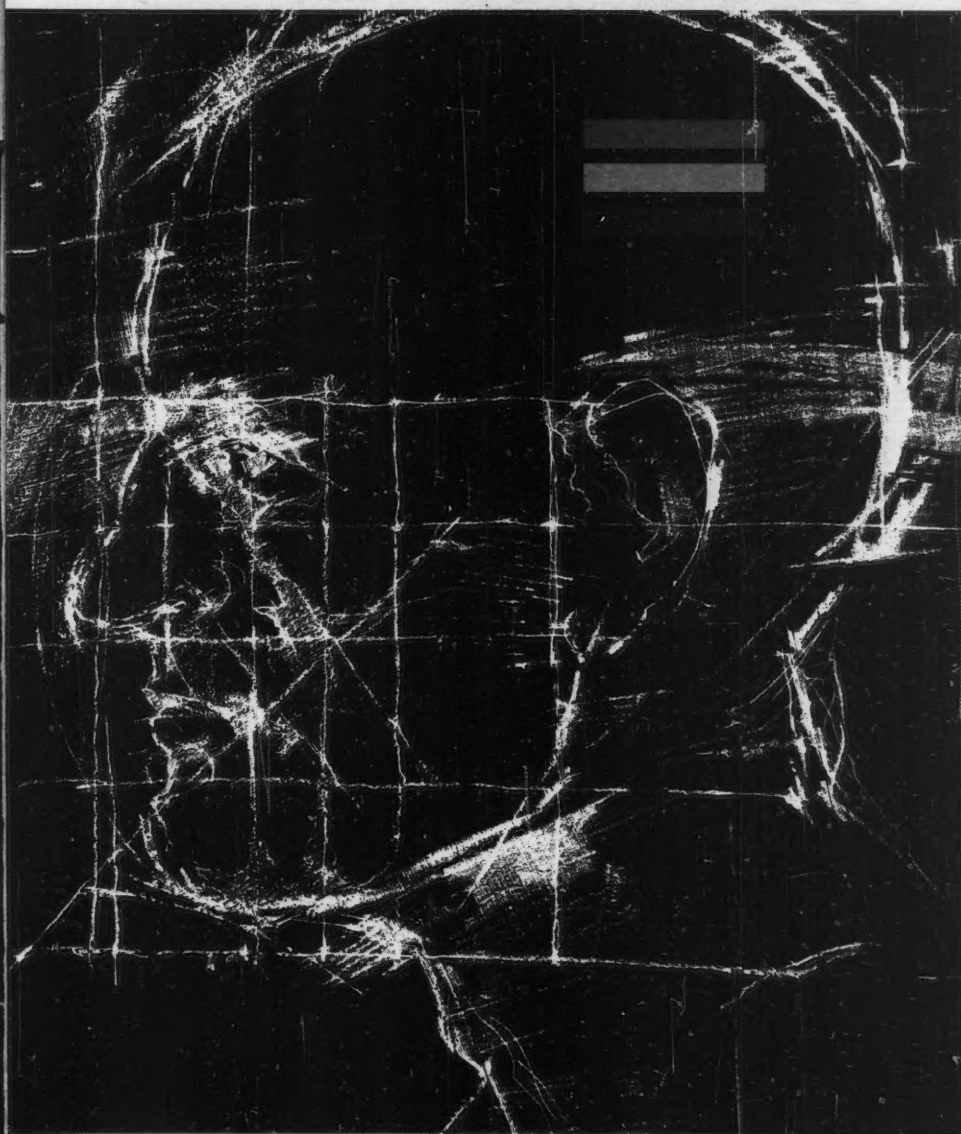
Blox also reportedly generates an application Help file with Help keywords for each part of the screen. Blox is offered with a core graphics library and a Blox user-interface library with more sophisticated support routines.

A single-CPU license for Blox is priced at \$8,000 (binary only) with discounts for additional licenses.

Rubel Software, 215 First St., Cambridge, Mass. 02142.

See AIDS page 82

software that links



SOFTWARE & SERVICES

AIDS from page 81**INFOCENTRE LTD.**
Speedware release

Infocentre Ltd. has announced a new release of the Speedware fourth-generation language for Hewlett-Packard Co.'s HP 3000.

Speedware now takes advantage of the touch-sensitive screen feature of HP's HP 150 microcomputer.

Speedware consists of

four modules: Genasys, Designer, Reactor and Documenter.

The new release also includes the support of function keys from Infocentre's Genasys, for owners of HP262-type terminals.

The total package is priced at \$19,500. Genasys is a stand-alone module for \$10,000, and Reactor also stands alone for \$4,000.

Infocentre, Suite 1620, 110 Plaza, New York, N.Y. 10119.

APPLICATION PACKAGES**ADESSE CORP.**
Contact

The Adesse Corp. has announced acquisition of Tymshare, Inc.'s VMShare conferencing software, which it will market under the name Contact. Contact replaces Adesse's VM/SP Electronic Conferencing system.

Contact is written primar-

ily in PL/I and employs a virtual machine communications facility and a service virtual machine to implement file sharing and to isolate users from secured conference data. For the most part, Contact is compatible with Electronic Conferencing and should not require end-user retraining, a spokesman said. An Electronic Conferencing-to-Contact file conversion utility is included with the package.

Delivery of Contact begins

in July, and it is priced at \$15,000. Contact is also offered with a per-CPU license for a monthly charge of \$350. Maintenance is included in the monthly charge, and license owners can also subscribe to maintenance for \$150 per month.

Adesse, P.O. Box 607, Ridgefield, Conn. 06877.

FINANCIAL SOFTWARE, INC.**Ledger Interface**

Financial Software, Inc. has introduced the Ledger Interface package to allow accountants to access an automatically prepared transfer file from a client's microcomputer.

Using the Ledger Interface software, accountants can reportedly have full access to the data necessary to prepare a client's financial statements and to do his bookkeeping and tax reporting. The Ledger Interface runs on IBM System/34 and 36. Transactions can reportedly be downloaded from those machines to an accountant's IBM Personal Computer in a format that will interface with Lotus Development Corp.'s 1-2-3 spreadsheet software.

The Ledger Interface package is priced at \$1,650.

Financial Software, 3139 Campus Drive, Atlanta, Ga. 30071.

CONTROL DATA CORP.
Icem enhancements

Control Data Corp. has introduced an enhanced version of its Integrated Computer-Aided Engineering and Manufacturing (Icem) software for use with its Cyber series of computers.

The system features enhanced operations capabilities in design, drafting and numerical control. Icem design/drafting and numerical control functions are tied together by a shared data base, giving designers and engineers access to the same version of all data and drawings generated.

The system's design/drafting function enables construction of two- and three-dimensional geometries; and the numerical control capability allows generation of control tapes automatically from design geometry. Enhancements are primarily in the areas of design work plane and space, entity selection, part integrity, tablet programs, Bezier curves and on-line help functions.

Purchase prices for the Icem system begin at \$62,250. Lease pricing begins at \$1,470 per month. A utility package is required to use Icem and is priced at \$2,475 or can be leased for \$85/mo.

Control Data, 8100 34th Ave. S., Minneapolis, Minn. 55440.

See **TOOLS** page 84



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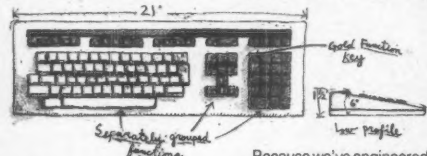
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Associate OS/VS Systems will develop and maintain the SAS supervisor and related components for the IBM OS/VS environment. Knowledge of IBM 370 Assembler programming language and a bachelor's degree in computer science, or equivalent experience, are required. Experience with the development and support of large software systems is desirable. Familiarity with the OS/VS supervisor and data management services, operating system concepts, compiler design and implementation, PL/I, TSO, SPF, and the SAS System is a significant asset.

OS/VS Systems Software Developer will develop and enhance the SAS supervisor and related components for the IBM OS/VS and MVS/XA environments. Applicants must have programming experience in IBM 370 Assembler language and in-depth knowledge of MVS system macros, utilities, diagnostic aids, and memory management. Experience with the development and support of large software systems is highly desirable. Familiarity with several of the following is a significant asset: operating system concepts, compiler design and implementation, PL/I, TSO, SPF, and the SAS System. A bachelor's degree in computer science, or equivalent experience, is required.

Compiler Systems Developer will assist in the development of a PL/I-like compiler. Applicants must have a BS degree in computer science or mathematics with a strong background in block structured languages, preferably in PL/I. Experience with complex systems software design and implementation is required. Familiarity with Assembler languages, particularly IBM 370 Assembler, and compiler and code generation issues is a significant asset.

VAX/VMS Systems Programmer will assist in the development of host routines and SAS interface routines for Digital VAX systems. Applicants must have at least one year of experience with VMS and Macro-11. PL/I programming experience is a significant asset.

Minicomputer Programmer will develop the SAS System for various minicomputers. The individual will write and maintain code and documentation, transport code, prepare master tapes, and educate users. A BS degree, preferably in computer science, is required. Minicomputer experience, knowledge of SAS software, and Assembler language experience are preferred.

Testing & Documentation Developer will work on several minicomputers to develop and maintain test and benchmarking programs for the SAS System. This person will help develop internal and external documentation for the system. Applicants must have one to two years' programming experience on minicomputers. Working knowledge of PL/I and SAS software is desirable. A BS degree or the equivalent is required.

Graphics Software Developer will plan, design, and implement color graphics applications, including continuous shading for data display, graphical input, mapping applications, and user interfaces. Applicants must have a BS in computer science and more than two years' experience in software development. A thorough knowledge of data structures and algorithms and at least one structured programming language is required. Graphics, PL/I, and MVS/TSO experience is preferred.

Microcomputer Software Developer will design and develop software for microcomputers. Applicants must have in-depth knowledge of 8086 Assembler language, C language, and IBM PC-DOS BIOS. A bachelor's degree in computer science or equivalent experience is required. Experience with full-screen and graphics drivers is highly desirable. Applicants must provide samples of related work experience.

Technical Support Representatives will specialize in a particular area of expertise relating to the SAS System. The Technical Support Department supports SAS users in areas ranging from syntax specification and documentation interpretation to software problem investigation and new product testing. Primary responsibilities include the support of software installation, operating system dependent procedures, file access methods, and quality

assurance testing of new releases and products. Applicants must have a minimum of two years' SAS programming experience in the VM/SP or OS/MVS operating environment, and experience in resolving system-related error conditions at the application programming level. DOS/VSE experience is a significant asset. A bachelor's degree is required. Technical support experience is preferred.

Senior Technical Support Representative (IBM MVS) will diagnose problems at the SAS supervisor/operating system interface level, prepare and test software patches, and provide technical assistance to other representatives. Working knowledge of machine code, architecture, and system utilities is required. Applicants must have programming experience in IBM Assembler language and in-depth knowledge of MVS system macros, diagnostic aids, and memory management. Excellent verbal communications skills and a BS, preferably in computer science, are required.

Senior Technical Support Representative (DEC VMS) will diagnose problems at the SAS supervisor/operating system interface level, prepare and test software patches, and provide technical assistance to other representatives. Programming experience in PL/I and VAX MACRO-32 languages and working knowledge of machine code, architecture, and system utilities are required. Applicants must have a BS degree, preferably in computer science, and excellent verbal communication skills.

Instructors will teach a variety of SAS training courses. Formal training in data processing and teaching or public speaking experience are required. Applicants must have a bachelor's degree, preferably in computer science, and a minimum of one year SAS programming experience. An advanced degree in an applied field is a significant asset. This position requires 10 days of travel per month.

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SOFTWARE & SERVICES

TOOLS from page 82

ORIGIN, INC.
Client Tracker

Origin, Inc. has announced a client history data base and telephone dialer that runs under Digital Equipment Corp.'s RSTS/E and VMS operating systems on the DEC PDP-11 and VAX-11 computers. The Client Tracker keeps track of who has called, when to call and what was said in past conversations, a company spokesman said.

The program was written in Dibase and can handle as many users as there are CRT terminals. Each user has a dialer that connects between their terminal and the computer. The dialer also attaches to their desk phone and works with standard single- and multiline telephones.

Each user can have up to eight different data bases, such as clients, distributors and sales representatives, the vendor said.

Client Tracker can generate lists, display the three key people in a company, dial the client, update client history, generate mailing lists or labels and check redundancy when entering new companies. The price of Client Tracker for the RSTS/E version is \$2,000 plus \$160 per dialer, and the VMS version is \$2,500 plus \$160 per dialer.

Origin, 9136 Gibson St., Los Angeles, Calif. 90034.

INTERNATIONAL
IMAGING SYSTEMS, INC.
System 600

International Imaging Systems, Inc. has announced a multiuser image processing software package to integrate image and nonimage applications.

The System 600 uses International Imaging's Model 75 digital image processor and is compatible with Digital Equipment Corp.'s VAX-11 under DEC's VMS operating system and Motorola, Inc.'s MC68000/Unix central processors.

Modular in design, System 600 accommodates multitasking, multiple hosts and multidimensional data bases with network control and data base management system capabilities to support a series of applications modules, the vendor said. Each workstation on a System 600 can be used for a different image or nonimage application.

The System 600 will be available in fourth-quarter 1984, and costs per workstation are less than \$25,000. Current users of International Imaging's System 575 operating on VAX-11 or MC68000 units can upgrade to the System 600.

International Imaging Systems, 1500 Buckeye Drive, Milpitas, Calif. 95035.

TEKTRONIX, INC.
SA tools

Tektronix, Inc. has announced a set of automation tools designed to complement its existing microcomputer software development tools and provide front-end system and software requirements definition through graphics editing, error checking, error correcting and data output techniques.

The Structured Analysis (SA Tools) include a graphics editor that allows the entry and modification of data-flow diagrams and automatically formats the diagrams in accordance with accepted SA notation.

A separate tool checks for errors such as undefined data paths and syntax errors in the data dictionary. Another tool checks the consistency of the analysis, including relationships between elements at different levels in the hierarchy.

An error-correction module automatically maintains the consistency of process names and numbers and data dictionary entries in the SA specification. A formatting feature allows the entire analysis to be outputted to devices that include a color copier and plotters, the vendor said.

The SA Tools run on both the vendor's 8560 Microcomputer Development System, with the graphics editor tool compatible with the vendor's 4100 with Colorkey and 4110 color terminals.

The 8560-compatible version is available immediately and is priced at \$9,500.

Tektronix, P.O. Box 1700, Beaverton, Ore. 97007.

INTEGRAL SYSTEMS,
INC.
Payroll/Personnel

Integral Systems, Inc. has announced a payroll and personnel package for the IBM System/38 that reportedly enables operators to use more easily on-line query and report writing.

Payroll/Personnel capitalizes on the machine's hardware capabilities while retaining application efficiencies previously developed for varied system environments, a spokesman said.

The on-line, real-time program is written in native RPG-III language. Payroll, personnel management and data security modules are available now, with three more packages planned. The modules can be used on a stand-alone or fully integrated basis, the spokesman said.

An optional report writer is available, which gives both on-line query and hard-copy output capabilities. Scheduled for release in September, the modules will be priced at \$40,000.

Integral Systems, 165 Lennon Lane, Walnut Creek, Calif. 94598.

UNIPRESS SOFTWARE,
INC.
Leverage List Processing
System

Unipress Software, Inc. has announced the Leverage List Processing System for use with the Unix operating system.

According to a spokesman, the Leverage List Processing System is a menu-driven system that provides an environment for list processing. It handles data entry, review and selection and provides facilities for letters, reports, labels and CRT viewing.

Screen layouts are said to be user-definable; records can contain up to 70 data fields; and an unlimited number of screen layouts are supported. The system maintains a complete history of date, content and recipient of each correspondence. It can also sort automatically by Zip Code.

The Leverage List Processing System is available for Digital Equipment Corp.'s VAX-11 processors (\$995), Motorola, Inc.'s MC68000 (\$495) and Intel Corp.'s 8086 microprocessors under Unix (\$495).

Unipress Software, Suite 312, 2025 Lincoln Highway, Edison, N.J. 08817.

BOEING COMPUTER
SERVICES CO.
Fidap

Boeing Computer Services Co. has announced Fidap, a Fluid Dynamics International, Inc.-developed software package said to provide a fully documented fluid dynamic analysis program with a finite element method of analysis for modeling a range of fluid types and a choice of nonlinear solutions methods,

giving the user maximum flexibility in choosing solution strategies.

The software performs two-dimensional, axis-symmetric and three-dimensional steady state or transient simulations in complex geometries.

The software is available for Control Data Corp., IBM and Cray Research, Inc. computers as well as Digital Equipment Corp.'s VAX-11 computers, the vendor said. Single-copy perpetual lease prices vary from \$35,000 to \$60,000.

Boeing Computer Services, 7980 Gallows Court, Vienna, Va. 22180.

RAMTEK CORP.
GKS graphics software

Ramtek Corp. has introduced a graphics software package which uses the Graphics Kernel Standard (GKS) and reportedly offers application program portability across the Ramtek 2020 and 9460 graphics product lines.

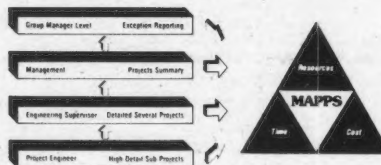
Ramtek's GKS graphics software reportedly supports interchangeable device drivers for most Ramtek graphics terminals, display generators and geometry processors.

GKS reportedly follows the proposed international GKS Level 2B programming standard, which defines a consistent interface between specific graphics applications and a library of generic, two-dimensional graphics subroutines written in Ansi Fortran 77.

GKS is provided with documentation and installation instructions for \$7,500.

Ramtek, 2211 Lawson Lane, Santa Clara, Calif. 95050.

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MAPPs is a generic management planning and decision modelling tool. Its interactive, conversational structure lets non-computer oriented managers easily interrelate project TIME, COST, and RESOURCES.

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SOFTWARE & SERVICES

TELESIS SYSTEMS CORP.
Fits and Tolerances

Telesis Systems Corp. has introduced a software option for its Mechanical Design Application package. Fits and Tolerances provides automatic labeling of dimensions, automatic checking and generation of pass/fail reports on a CRT or line printer.

Fits and Tolerances allows the designer to assign labels to all design dimensions. He can then extract a complete list of all labels with dimensions and tolerances, either by one drawing or over the entire project, according to the vendor.

The software runs on Telesis' Mechanical Design and Drafting Workstation and is priced at \$3,900.

Telesis Systems, 21 Alpha Road, Chelmsford, Mass. 01824.

GNOSIS, INC.
Bottom Line

Gnosis, Inc. has announced a new version of its manufacturing control software, the Bottom Line. The software runs on Burroughs Corp.'s B20 computer series and Convergent Technologies, Inc.-compatible machines.

Highlights of the Version 3.0 include a completely redesigned invoicing system with automatic preparation of order acknowledgements and packing sheets, an integrated inquiry and reporting capability and factory productivity and accounting summary reports, a company spokesman said.

The Bottom Line Version 3.0, packaged with a User's Quick Reference Guide, two volumes of system documentation and more than 300 Help screens, is priced at \$7,500.

Gnosis, 4005 Chestnut St., Philadelphia, Pa. 19104.

MCDONNELL DOUGLAS AUTOMATION CO.
Computer-aided design interfaces

McDonnell Douglas Automation Co. (McAuto) has announced interfaces that allow output from its engineering analysis programs to be turned into precision-detailed construction drawings by its General Drafting System (GDS).

The engineering programs include the McAuto's Strudl for structural design and analysis and Cogo/roads for highway design. The engineering applications, the new software link and GDS execute on Digital Equipment Corp.'s VAX-11 computers, or on Prime Computer, Inc.'s Primos 550 series.

The links are being offered free to current customers.

McDonnell Douglas Automation P.O. Box 516, St. Louis, Mo. 63166.

GRAPHIC COMMUNICATIONS, INC.
Graphwriter

Graphic Communications, Inc. has announced that its presentation graphics package will now support the new Hewlett-Packard Co. HP 7550A plotter. Graphwriter is available for the IBM Personal Computer and Personal Computer XT.

Graphwriter allows the user to reproduce up to 36 different charts, with up to 100 copies of each, by using a batch mode capability. In this way, a presentation can be created at a personal computer and then reproduced on the plotter at one time without operator assistance, a spokesman said.

The Graphwriter Combination Set is priced at \$595. A Basic Set and an Extension Set may also be purchased separately for \$395 each.

Graphic Communications, 200 Fifth Ave., Waltham, Mass. 02254.

CHASE DECISION SYSTEMS
Version 16, Xsim

Chase Decision Systems has announced Version 16 of its Xsim proprietary decision support applications software.

The release features a "true daily data facility" for use in statistical modeling. True daily data is said to enable users to treat daily data as a true period, allowing users to work with five-, six- or seven-day weeks and not be restricted to 200- or 365-day years. The facility automatically accounts for weekends depending on the "periodicity" chosen.

Uses to which the facility can be applied include stock and bond analysis, international securities analysis, commodity and currency tracking, daily production and sales tracking and detailed financial simulation of corporate finance. The Xsim system is said to combine data management, ad hoc query, modeling and forecasting techniques, consolidation capabilities and microcomputer-to-mainframe links for decision support.

Xsim runs on an IBM 370 series or compatible mainframe under IBM's VM/CMS operating system. It is priced between \$50,000 and \$150,000, depending on options selected.

Chase Decision Systems, 1000 Massachusetts Ave., Cambridge, Mass. 02138.

DATA BASE MANAGEMENT SYSTEMS**SOFTWARE HOUSE, INC.**
System 1032 Version 3

Software House, Inc. has announced that the new ver-

sion of its System 1032 data base management system runs on all Digital Equipment Corp. VAX-11 models under DEC's VMS operating system. Version 3 enhancements are built-in compiled procedures, record-level locking and pattern-match queries.

Compiled procedures allow programs to be written and debugged interpretively as interactive commands or command files, then compiled and stored as procedures.

The locking facility prevents data that is being explored from being changed by other users. Pattern-match queries allow data to be retrieved on the basis of "wild card" information.

Licenses range from \$15,000 for the VAX-11/730 to \$40,000 for the VAX-11/785. VAX-cluster and quantity discounts apply.

Software House, 1105 Massachusetts Ave., Cambridge, Mass. 02138.

TYMSHARE, INC.
Magnum

Tymshare, Inc. has announced that its Magnum relational data base management system, previously available on the firm's time-sharing system, will now also be sold on an in-house license basis for Digital Equipment Corp. VAX-11 models, a vendor spokesman said.

Magnum was reportedly designed to be used by data processing professionals and occasional users. Its fourth-generational characteristics are said to include a query language that enables those with minimal computer experience to use the system for order entry, inventory and project control, as well as other applications.

Other fourth-generational characteristics are said to include a report writer, ADL — an applications development language — and a semi-intelligent, syntax-directed editor.

According to the spokesman, Magnum is priced as follows: VAX-11/730 or 11/725, \$20,000; VAX-11/750, \$35,000; and VAX-11/780, \$45,000.

Tymshare, 20705 Valley Green Drive, Cupertino, Calif. 95014.

BRITTON LEE, INC.
Mirrored disk option

Britton Lee, Inc. has introduced a mirrored disk option that reportedly increases the data reliability and accessibility of its IDM 500 series of Intelligent Database Machines (IDM) operating on Digital Equipment Corp. VAX-11 systems.

The optional feature is designed to provide protection against media failures and disk crashes by duplicating critical data bases on a redundant set of disk drive, a

Continued on page 86

#3

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#2

SOFTWARE & SERVICES

Continued from page 85
spokesman said. In the event of a single disk failure, users are reportedly protected from the permanent loss of relational data base information because of the IDM's ability to maintain identical read/write data.

An additional feature of the mirrored disk option provides the IDM user with hardware redundancy as insurance against downtime caused by disk failure, the spokesman said. As a result, data availability is improved because the IDM can continue to function, even if a disk drive fails during on-line operation.

The price is \$9,500.

Britton Lee, 14600 Winchester Blvd., Los Gatos, Calif. 95030.

3CI Infocen price restructuring

3CI has announced a new price structure for its Infocen relational data base management system. Previously, Infocen had been priced at only at two levels. Now, the firm will price each level of Infocen on the basis of whether it is for use on a Class II or Class III computer, 3CI said.

Class II computers are the Digital Equipment Corp. VAX-11/725 and VAX-11/730 and the Data General

Corp. Eclipse MV/4000. Class III machines are the DEC VAX-11/750 and larger and the DG Eclipse MV/6000, 8000 and 10000.

Level 1 of Infocen reportedly includes the relational data base management system, Basic Statistics, Basic Reports, five security levels, an intelligent user interface and a two-day training course, among other features.

Level 1 Infocen is priced at \$12,900 for a Class II machine and \$19,900 for a Class III machine. Level 2 Infocen is priced at \$24,900 for a Class II machine and \$39,900 for a Class III computer.

A trial version of Infocen is offered for eight weeks at \$650 for Class II machines and \$990 for Class III computers.

3CI, 155 W. Harvard, Fort Collins, Colo. 80525.

LANGUAGES

PRODUCTIVITY PRODUCTS INTERNATIONAL, INC. Objective-C Version 2.0

Productivity Products International, Inc. has announced Version 2.0 of Objective-C, a preprocessor that turns any C compiler into an object-oriented language with the class/object/message semantics of Xerox Corp.'s Smalltalk-80.

Objective-C is available for Digital Equipment Corp.'s VAX-11 VM-Unix; Sun Microsystems, Inc.'s Unix; and Fortune Systems Corp.'s 3216, the vendor said.

The package generates C source code so both the compiler and the generated code are reportedly as portable as any C program.

Added features in Version 2.0 include improved facilities for team programming, a large library of reusable functions derived from Smalltalk-80 and a library that supports parts of the Smalltalk-80 user interface on standard alphanumeric terminals, according to the vendor.

Prices are \$5,000 for VAX-11/730 or equivalents, \$10,000 for VAX-11/750 and \$15,000 for VAX-11/780, which includes one-year support.

Version 2 is also available to educational institutions for \$2,500 on any machine, the vendor said.

Productivity Products International, 37 High Rock Road, Sandy Hook, Conn. 06482.

BEI CORP. Cobformat

BEI Corp. has introduced a utility that reportedly reformats Cobol source code to user-defined specifications.

Cobformat is driven by more than 60 definable pa-

rameters and a system dictionary.

Each parameter has a default value, which can help minimize setup time, the vendor said.

Major features reportedly include paragraph numbering, releveling, verb alignment, spacing and highlighting.

The program is available for IBM and plug-compatible systems running under IBM's DOS and OS operating systems.

It is priced from \$2,000 to \$6,000 for a one-time license, depending on hardware used, the vendor said.

BEI, Suite 204, 1836 Westlake N., Seattle, Wash. 98109.

REMOTE COMPUTING SERVICES

AUTOMATED DESIGN CENTERS N/C

Automated Design Centers, a computer-assisted design and manufacturing service bureau, has added numerical control (N/C) parts programming and tape preparation to its engineering, drafting and other services.

According to the vendor, this capability previously was available only from an

Continued on page 90

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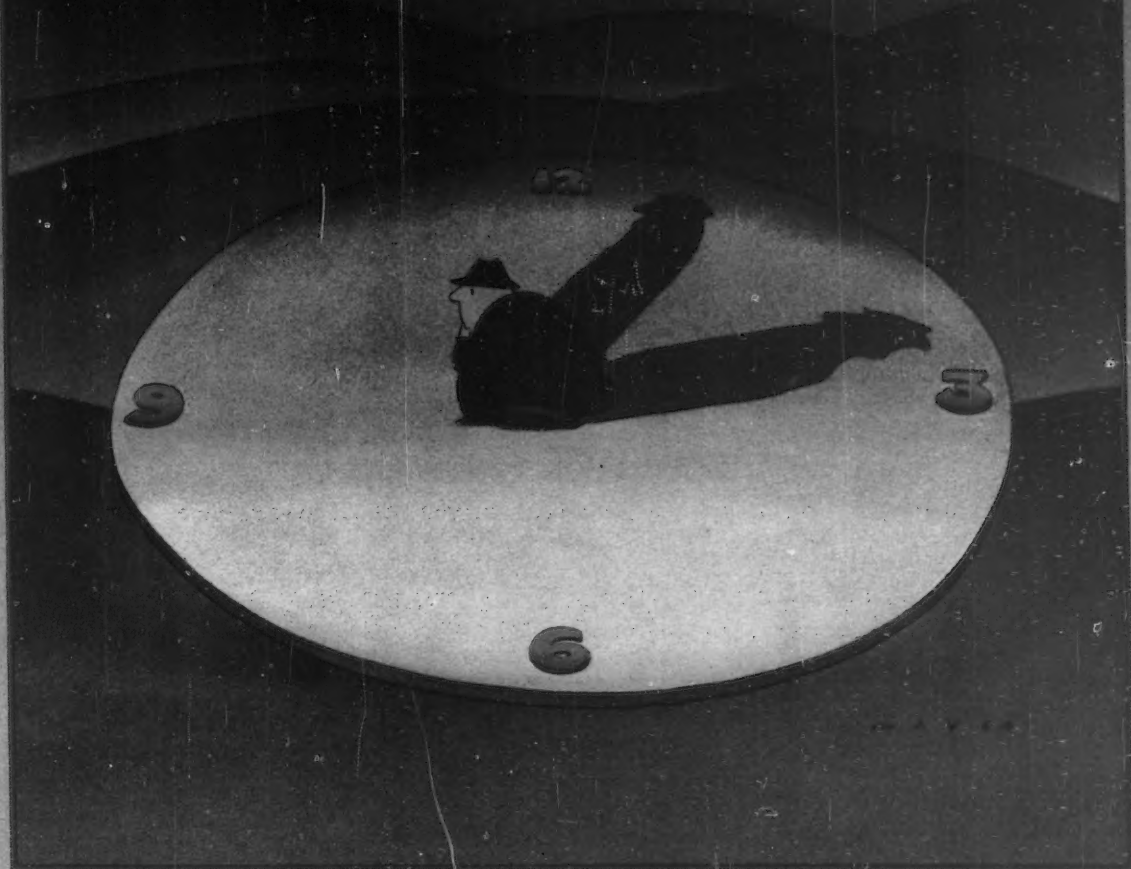
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CW7/RBA

SOFTWARE & SERVICES

Continued from page 86
in-house system.

The vendor's services are provided using the McDonnell Douglas Automation Co.'s three-dimensional computer-aided design and manufacturing Unigraphics systems.

The basic price is \$55/hour, according to the vendor.

Automated Design Centers, Building B-100, 19401 S. Vermont Ave., Torrance, Calif. 90502.

GENERAL ENERGY TECHNOLOGIES CORP. Ecas

General Energy Technologies Corp. (GETC) has introduced the Energy Conservation Analysis System (Ecas), a system for monitoring, recording and changing energy use requirements.

Ecas is said to be a menu-driven, prompt-oriented system that leads users through a step-by-step energy analysis. Users enter nameplate

data about the motor or light they are analyzing, and the system looks up all other facts about the unit, including expected life, cost and efficiency.

The Ecas system is offered on the General Electric Information Services Co. (Geisco) network, which reportedly allows users to collect energy use data from anywhere in the world over local phone lines. A user can access the Geisco net via his own microcomputer or dumb terminal

or via a Hewlett-Packard Co. HP 150 micro or a Digital Equipment Corp. Rainbow 100 micro, both offered under a licensing agreement with GETC.

The GETC license for the Ecas system is priced at \$20,000 for five years or at \$492/mo. Geisco access is priced at a minimum of \$40/mo, with average users paying roughly \$500 to \$700/mo.

General Energy Technologies, P.O. Box 2062, Newport Beach, Calif. 92663.

MSA from page 77

Peachpak series. Starting this month, Peachlink will be broken out separately as a product and will be priced in bulk orders in the neighborhood of \$1,000 per unit.

MSA hopes the attractiveness of Peachlink will become apparent in its ease of use with other popular accounting packages, such as Lotus Development Corp.'s 1-2-3 and Ashton-Tate's Dbase II.

Peachlink can download data to micros from mainframes that are not necessarily using MSA systems software and still keep the data's native file format, MSA claimed.

"We are going to aim Peachlink at the [data base management systems] market to perform distributed data base management," MSA's Ken Guthrie said.

Peachlink will be available for all of MSA's mainframe accounting packages. Additionally, it will permit the user to create templates for the use of graphs in word processing applications.

Other initiatives

There was a wealth of excitement over other initiatives being taken by the company. Information Quick, which has been under development for the last five years, should be ready for the market by the end of the year, MSA said.

It is based on common English commands and uses a dictionary-based approach. The criteria for data files can be spread across differing data bases, and the user can select the order of the report that will be generated, the company said.

At the final session of the conference, Dennis Vohs, MSA's executive vice-president of product development, covered some additional enhancements MSA system users can expect in the coming months.

These include real-time accounting, human resources, manufacturing and purchasing packages. On-line capabilities are upcoming for all of MSA's 11 application packages.

Perhaps the most exciting work, Vohs said, is the R&D going into functionally integrating MSA's applications. For example, MSA plans to integrate the purchasing, accounts payable and manufacturing software systems in a factory.

MSA also plans to distribute more mainframe-type applications to the micro, Vohs said.

Thus, companies with a large number of subsidiaries or divisions will be able to handle their own general ledger, accounts payable or payroll functions on a personal computer with uploading capabilities to the mainframe, he said.

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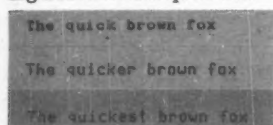
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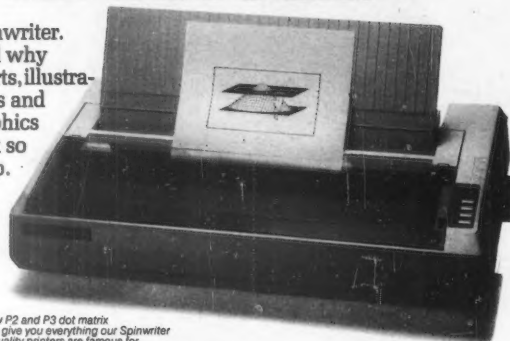
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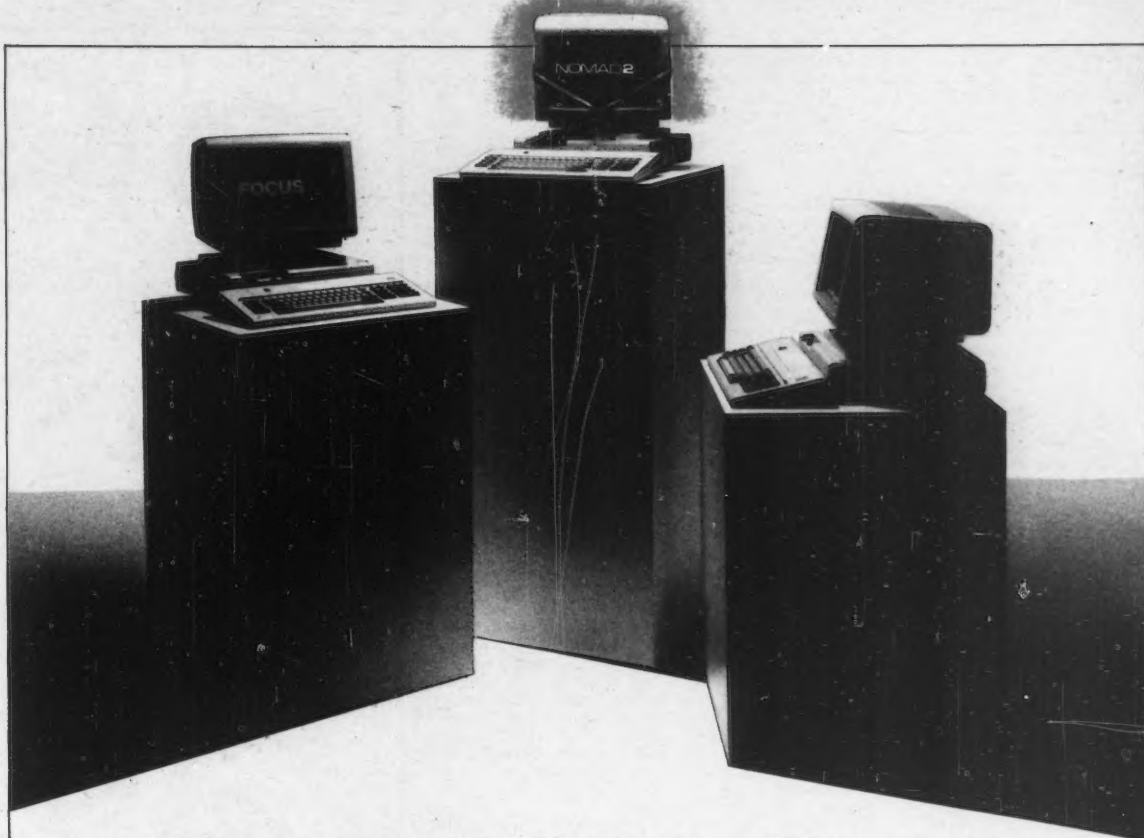
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SOFTWARE & SERVICES

CICS from page 77

perceived overcomplexity of generated applications.

Oddly, while some users cited CICS's customization options as a strength, others said the system required excessive tailoring to meet user requirements. Other problems mentioned included what some said was the system's unfriendly user interface, printing difficulties, poor recovery facilities and weak performance monitoring and fault diagnosis capabilities. The survey indicated that a poor interface between CICS and IBM's VM operating environment caused a number of user problems.

When asked what func-

tions they would like to see introduced or improved in the near future, nearly 32% of users said they wanted facilities for on-line or dynamic resource control and table update. A number of users said they would like integrated on-line performance monitoring and tuning aids and performance modeling tools.

Also mentioned were improved security capabilities and better diagnostic aids and facilities. Other users said a reduction in storage violations through improved storage protection would be useful — particularly to prevent the corruption of CICS code and system control blocks.

In conclusion, the Xephon

report stated that "despite ease of installation, provision of rich function and continuing front-line development, there are still significant areas where IBM has fallen short. Perhaps the most important are security, table updates, sign-on procedures, performance considerations and diagnostic aids. Package solutions have plugged some of these gaps, and no doubt the provision of third-party software will continue to flourish as long as CICS remains popular."

"CICS in Practice" can be obtained for \$34 from Xephon Technology Transfer, Western House, 3 London Road, Newbury RG13 1JL, Berkshire, England.

LINK from page 77

access should be at the record level; a full file transfer should not be necessary. A whole file should be transferable if desirable and appropriate. The user should be able to specify record extract criteria to control record selection.

■ Implementation of the product should require as little work on the part of the DP staff as possible. If we simply remove one time-consuming service request and replace it with another, there is no gain in productivity. As much of the link software as possible should reside on the micro. The required mainframe software should have the least impact on the existing installation. No changes should be required to the mainframe software, and the link software should be insulated from impact by changes in the host software. Look for a modular approach at both the mainframe and micro levels in terms of code development.

■ The involvement of the DP staff should be heavy only during the initial installation and training period. Following this period, the

end user should be able to operate relatively autonomously. The best products allow the DP staff to prepare masks or templates. These are logical views of the data in the data base files using data names and other descriptive terms with which the user can easily identify and that he can use to gain access to the data. Typically, corporate DP will also provide initial user training.

■ Security is essential. The best micro-to-mainframe link products utilize all the security features built in to whichever teleprocessing monitor is already in use. Additional layers of security must also be provided at the template level. These ensure that users are prevented from accessing templates for files they are not allowed to have.

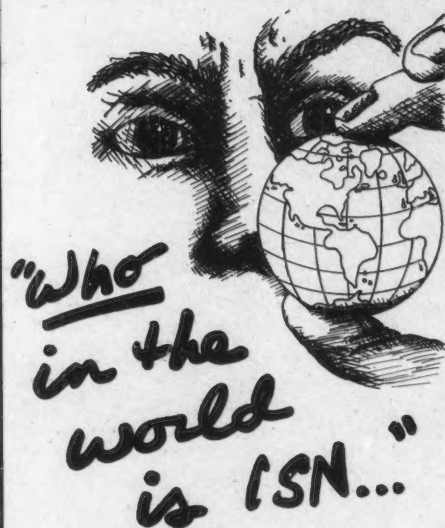
■ The more transparent the technical details of the transfer are to the user the better. The user should not be required to convert the data base records after they are transferred. If, for example, the transferred records need to be in Software Arts, Inc.'s Data Interchange Format for use in a spreadsheet, the link software should be

able to handle the conversion.

■ All data formatting should be handled automatically. If any reordering of the fields for display or local storage is desired, the user should be able to provide the appropriate information, and the reorganization should be accomplished during transfer. If local storage is desired, the link product should provide some flexibility in the type of output file in which the records will be stored.

Advanced features ensure that the link software will accommodate emerging needs. One of the most desirable of these features is the ability to interface the link software with a variety of high-level languages such as Basic, Pascal and C. This allows users and DP staff to write applications on the micro that can then utilize and manipulate data stored in mainframe DBMS files just as though that data were resident on the micro.

Using whatever exists the application development language allows, the programmer specifies the template to be used and issues generically worded requests to the DBMS. The link software translates the request into terms native to the DBMS, which in turn services the request and returns the requested records to the micro.



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Who invented general-purpose

By Kathleen R. Mauchly

Before November 1940, John Mauchly had successfully tested certain components of his proposed computer and convinced himself that it was possible to build a cheap, reliable digital device using only electronic elements. He was now ready to build. The machine was intended primarily for use in his own laboratory and would be paid for out of his own pocket. His students at Ursinus College well remember his scrounging for tubes and other components that would produce a machine "with no moving parts."

It is plain that Mauchly was planning a digital device. On Dec. 4, 1940, he wrote to John de Wire: "For your own private information, I expect to have, in a year or so, when I can get the stuff and put it together, an *electronic computing machine*, which will have the answer as fast as the buttons can be depressed. The secret lies in 'scaling circuits,' of course."

Here we have the seeds of an Eniac: 1) ring (in this case biquinary) counters that could perform the arithmetic and store the numbers; these were the basic building blocks; 2) additional vacuum tubes for control and

circuit switching so that the contents of the counters could be transferred from one register to another; 3) pulse formers with controls on amplitude and duration to precede each ring-counter circuit; 4) a low-frequency oscillator-type source for pulses.

He planned a keyboard input for the data and operations. The design was based on the standard mechanical desk calculator, with electronic ring counters taking the place of the mechanical counters.

Mauchly first met John Atanasoff at a meeting of the American Academy for the Advancement of Science at the University of Pennsylvania on Dec. 28, 1940. Mauchly presented a paper on weather prediction and analysis and mentioned that the results had been computed on the harmonic analyzer he had designed and built. After the talk, Atanasoff approached Mauchly, introduced himself and mentioned that he, too, was designing and building a computer. They briefly discussed harmon-

ic analyzers and the possibilities of an electronic computer. In all, the conversation lasted less than 20 minutes.

As exhibited by diagrams and notes on the back of Mauchly's program, Mauchly freely discussed the possible components for an electronic digital computer. In Mauchly's hand is a circuit diagram of a binary counter containing three resistors, one condenser and two gas diodes that Mauchly had built previously. In Atanasoff's hand are the words "J.V. Atanasoff" and the initials "ISC" of Iowa State College and the phrase "\$2 per digit."

Atanasoff then said, as Mauchly later testified, "that he had under construction at Iowa State College a digital computer of his own design whereby he hoped to do a great deal of computation, and rather quickly. But when I asked him for further information on this, he said that he would not reveal this in any detail whatsoever — that the only way more information on (Continued on ID/4)

MAUCHLY

By John V. Atanasoff

During the last half of the 1930s, I began and pursued, with Clifford E. Berry, the subject of digital electronic computing. Included were my conceptions of computing and the construction both of a prototype and of what I later called the Atanasoff Berry Computer (ABC), to honor the memory of Berry's extraordinary competence. My contacts with computing began much earlier, though.

I am grateful that fate should have placed me at the beginning of this great adventure. I was well informed about how much such a computer was needed for science, technology and business. I must confess, however, that my expectations did not match what has currently been achieved and certainly do not match what we all expect of the future.

At this time in my professional history (1936-1938), I was not a very happy man. I had been forced to the conclusion that if I wanted a computer suited to the general needs of science and, in particular, suited to solving systems of linear algebraic equations, I would have to build it myself. I was leading a full life and had too much to

ATANASOFF

do; I did not want to search and invent, but sadly I turned in that direction.

I thought I knew how a computer should work. First, it would have to add and subtract, and later one could compound these operations into multiplication and division. At the time, I wondered if anyone had devised a definition of multiplication that was not based on addition, but the four elementary operations of arithmetic are interrelated, and all computing theoreticians have had to go along with that fact.

From the start, I was interested in carryover; it is the crux of the digital method. Whenever I have seen a new digital computer, I have always looked for the carryover. Even at that time, I had an idea that a radically different computer would have a new kind of carryover, and I believe that history has proved me correct.

What is the stuff with which the digital numbers are to be represented?

In those days, I had little precedent as to the architecture of a new digital computer of a larger size — that is, capacity. The only attempt at a machine of sufficient capacity for my purposes was the differential analyzer, an analog device that did not seem promising. In simple computers and even in the tabulators, the medium of representation was always mechanical, often the rotation of a shaft, and I must admit that I was inclined to follow this precept. I suppose that a feeling persisted that a computer needed stability and that this would be obtained by a mechanical system. A mechanical motion also permitted the use of dials or the like for taking data out of the machine.

Even at this early day, the principal other medium that occurred to me was an electric state of a circuit. I had studied electrical engineering and physics, and I had also studied and experimented with electronics, then in (Continued on ID/7)

the electronic digital computer?



The debate

John W. Mauchly and J. Presper Eckert or John V. Atanasoff — who invented the computer? Federal Court Judge Earl Larson ruled in 1973: "Eckert and Mauchly did not themselves first invent the automatic electronic digital computer, but instead derived that subject matter from one Dr. John Vincent Atanasoff." The judge's decision settled a case but not a controversy. Many still consider Mauchly and Eckert the inventors because the Eniac was the first operational automatic electronic digital computer.

The Annals of the History of Computing has published articles on the debate for five years. In an April article (Vol. 6, No. 2), Kay Mauchly presents documents, letters and diary notes to back up her contention that "All things that ended up in Eniac were things that Mauchly [her husband] had already been planning at Ursinus in the 1930s." Atanasoff tells his story in the July issue (Vol. 6, No. 3). He concludes: "Mauchly plainly thought that my computer was just wonderful. All of his objections to it were raised years later."

The articles take the reader back to the days before magnetic tape and microprocessors to show the ingenuity and resourcefulness of the inventors of the day. The reader must choose which story to believe, because certainly they conflict. Kay Mauchly is considering another article to counter Atanasoff's version. She told Computerworld: "I've never seen such a distortion of fact. I'm just appalled."

The articles here are abridged from the Annals of the History of Computing. For information on the publication, contact Afips Press, 1899 Preston White Drive, Reston, Va. 22091.

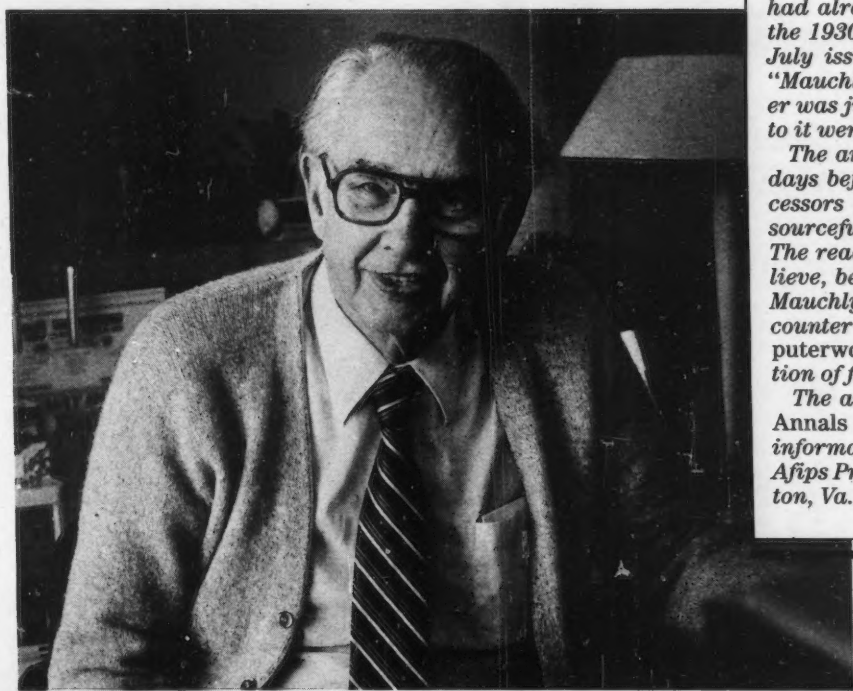


PHOTO BY CAROLYN CADDES

IN DEPTH/MAUCHLY

(Continued from ID/2)

this could be obtained would be by a personal visit to his laboratory at Ames, and he invited me to make such a visit."

Atanasoff left Mauchly with the distinct impression that Atanasoff's machine was all electronic. The phrase "\$2 per digit" that Atanasoff had written on Mauchly's notes made Mauchly very curious indeed.

Atanasoff was not trying to keep secret the fact that he was building a computer. He was just not revealing the method of operation.

Mauchly was stimulated by his meeting with Atanasoff. He had finally found someone who said he was trying to build a digital computer using vacuum tubes. His previous searches for a fast computing device had led him to investigate the multipliers being built by IBM and Remington Rand. The Remington Rand multiplier did a fast multiplication because it stored partial products (in mechanical cams), and this was the inspiration for the partial-products matrix that was built into the electronic multiplier of the Eniac.

Mauchly attended a meeting at Dartmouth College in the summer of 1940 and learned about George R. Stibitz's relay calculator. (Mauchly believed that Stibitz was the first to call his device "digital.") At Dartmouth, Mauchly met and talked with Norbert Wiener. They discussed computers and agreed that "electronics is the way to go," but Wiener did not indicate that he himself had any plans for going in that direction.

Even though the scientific litera-

Mauchly was delighted to have found in Atanasoff a believer in electronic computing. Two men in different parts of the country, inspired by different motives, had independently arrived at the idea that electronics could be used in a calculating device.

ture of the day described electronic circuits for binary counting (scaling circuits using pulses for counting), nothing described how to control these pulses for multiplication or division or for storing digits for future use, as Mauchly was planning to do.

Mauchly was delighted to have found in Atanasoff a believer in electronic computing. Two men in different parts of the country, inspired by entirely different motives, had independently arrived at the idea that electronics could be used in a calculating device. Yet their goals were different, and their approaches were different.

Mauchly's goal was to have a machine that would do the arithmetic of a conventional mechanical calculator, but it would use electronic tubes to do this arithmetic at electronic speeds and do it automatically because it would have electronic switches for storing and retrieving the intermediate results. The results of the arithmetic would be available on separate registers within the machine for further processing. The machine would be general-purpose, of course.

Atanasoff's goal was to have a machine that would solve simulta-

neous linear algebraic equations in 29 unknowns using the method of Gaussian elimination.

In anticipation of his visit to Ames during the spring break, and in hopes of getting the answer to the \$2-per-digit question, Mauchly spent every evening in his lab looking for a solution to this most perplexing problem: If Atanasoff is using vacuum tubes in his circuits, and each vacuum-tube assembly costs \$2 or more, how can he possibly produce a computer, which must certainly contain devices for storage, arithmetic and read-out, at that price?

Furthermore, since vacuum tubes operate at such tremendous speeds, the switching needed for automatic operation would also require quite a few vacuum tubes. The answer must be that one vacuum tube was being used to represent many digits. So, starting Jan. 1, 1941, Mauchly began exploring in his lab and in circuits on paper various ways of getting more information with fewer vacuum tubes.

His experiments along this line were in the design of circuits that had a digit represented by the amount of current or the amount of voltage at various places. He also

tried circuits in which the digit was represented by its position in a stream of 10 pulses. For example, the number 3 could be represented by one pulse occurring in the third position in a stream of 10 pulse times. (Today this would be called pulse-position coding.)

Mauchly's plans for getting to Iowa during the spring break fell through. Meanwhile, he continued working out his computer and constructed a number of the decade counters for it. These were, of course, the biquinary counters using gas tubes; he was eager to get something built and working.

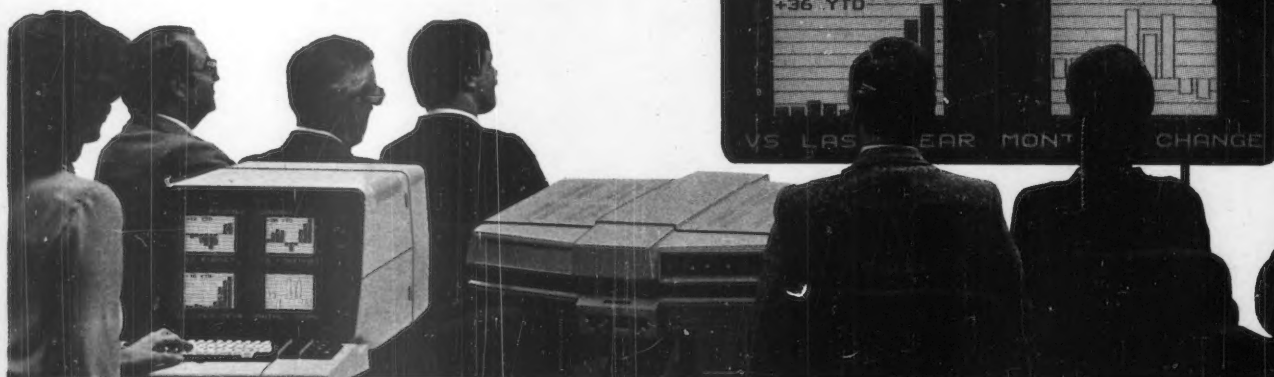
Mauchly arrived at Atanasoff's house on Friday evening, June 13. That evening they discussed (as Atanasoff has testified) "such gossip as he could bring me of computing machines from the East." The following morning Atanasoff took him to see the machine. Here at last was the answer to the intriguing "\$2 per digit." It was a shocker!

I quote from Mauchly's testimony at the trial of Honeywell, Inc. vs. Sperry Rand Corp. (in which the Eniac patent was challenged), but the idea is one I heard him mention many times before that:

"It was a disappointment because there had been nothing said in my meeting with him at the University of Pennsylvania which indicated that this machine was not a fully electronic machine. That's why my great curiosity, my great wonderment, how in the world did he do this for \$2 a digit, because I was thinking in terms of all-electronic things,

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IN DEPTH/MAUCHLY

which make use of electronic speeds. Almost immediately, of course, when I got out there, I began to learn, even though the machine was not operative, for instance, on Saturday, you could see the drum idea and you could begin to put together the picture that this is a mechanical gadget which uses some electronic tubes in operation, but it's still restricted in speed and was not what I was interested in from the point of view of electronic speed gadgets.

"The fact that it was also being built specifically to solve a special class of problems, rather than a general class, was quite obvious, of course, but that wasn't the thing that really worried me because what I had been looking for were ways of getting high-speed electronic things without paying too much for them."

The ultimate goal of the ABC (Atanasoff-Berry Computer) was to solve 29 simultaneous algebraic linear equations with 29 unknowns. The machine never accomplished this goal. A set of just five equations with five unknowns would have required the intervention of the operator over 500 times to eliminate the unknowns. The amount of operator-intervention steps increased by the cube of the number of coefficients.

In the case of five equations with five unknowns, 29 or 30 steps of operator intervention were required for one reduction into the next lower equation, or about 565 steps in the solution. It took about 17 minutes of running time to do the additions and subtractions and shifts for the five simultaneous equations, exclusive of

the time for the operator to put in these 500 to 600 steps. The amount of time for the mechanical solution on the ABC was roughly equivalent to the time required to get the solution by hand. This machine could not be described as automatic.

In the ABC, the drums containing the numbers revolved at the speed of one revolution per second. The revolving drums fed the binary digits of the coefficients serially into 30 separate adder assemblies, effectively restricting the speed of the unit to one addition time per second.

Mauchly puzzled over this. Why was Atanasoff using expensive vacuum tubes in the add-subtract unit when the whole advantage of them — their speed — was lost completely by the slow-moving, gear-driven drum?

The whole issue of \$2 per digit that had brought Mauchly to Iowa in the first place was now unimportant. It didn't matter how much it cost per digit if the tremendous speed and versatility that vacuum tubes offered were not being utilized.

No automatic programming for the ABC was planned or thought of. In a letter to Dawn Henry, Atanasoff said: "The concept of a machine that can be programmed for any (or almost any) conceivable process was not a part of our early ideas." The mechanical revolving drum setup precluded any branching or selection of variables.

The most interesting thing about Atanasoff's computer, from Mauchly's point of view, was the use of condensers as memory devices. Atanasoff described their problems and

how he solved them:

"The trouble with condensers is that they are leaky devices, and having charged a condenser, it will not stay charged, and this was the troublesome element of the era and this commenced to give me concern. I came to the conclusion that I could use condensers as a memory element by jogging their memory at regular intervals with a mechanism. The signal (on the condenser) is sensed, reconstructed and reinserted continually as the slow shaft revolves."

Mauchly thought that Atanasoff's way of "jogging the memory" was ingenious. Since Mauchly himself had been planning to use condensers as the memory element in his flip-flops, he was quite interested in seeing how someone else solved the problems with them.

In analyzing the situation later in 1944, Mauchly wrote in a diary note:

"I thought his [Atanasoff's] machine was very ingenious, but since it was in part mechanical, involving rotating commutators for switching, it was not by any means what I had in mind."

Mauchly began the Emergency Science and Management Defense Training Course at the Moore School on June 23, 1941. There he met J. Presper Eckert Jr., a master's degree candidate at the Moore School who was working for the summer as lab instructor for the government-sponsored course.

Since Mauchly had already done most of the experiments with his own students at Ursinus, there was

The ultimate goal of the Atanasoff-Berry Computer was to solve 29 simultaneous algebraic linear equations with 29 unknowns. The machine never accomplished this goal. A set of just five equations with five unknowns would have required the intervention of the operator more than 500 times to eliminate the unknowns.

free time available to exchange ideas with Eckert. The youthful Eckert (12 years younger) immediately impressed Mauchly with both his tremendous knowledge of electronics and his open-mindedness about what was possible with electronics.

Eckert already had a patent in the television field, on a light modulator using ultrasonic waves. Mauchly described to Eckert his ideas for building a computer using pulses from electronic tubes to get some speed. Eckert had some experience in using pulses from vacuum tubes. He thought Mauchly's idea was indeed feasible.

Mauchly's requirements for his "ideal" computing device — general purpose, of course — were:

a. Considerable number of

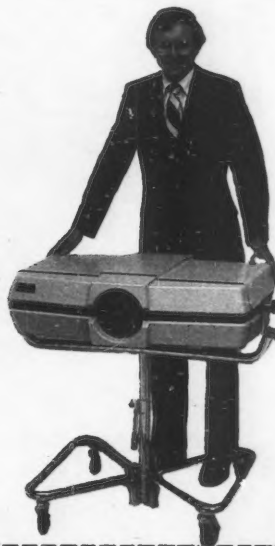
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IN DEPTH/MAUCHLY

registers (add to these readily).

b. Ability to transfer numbers from one register to another at will.

c. Ability to operate with number in one register on other register without losing number in original register — so that it may be used again, or checked.

d. Provision for a certain number of constant factors in machine. (A + B), or preset switches.

e. Possible automatic sequence of operations with subtotals printed (for numerical integration).

f. Ten-key operation?

All of these requirements ultimately appeared in the Eniac except 10-key operation.

In the fall of 1941, there was plenty of evidence that war was coming soon and that the Moore School was already being involved. Not everyone shared Mauchly's belief that fast

calculating devices would be needed.

Mauchly wondered if he could interest the Moore School in building a small machine that did the work of the differential analyzer — a digital electronic replacement — perhaps funded by the government as a possible wartime project.

On Sept. 30, 1941, Mauchly, eager to get something built, wrote to Atanasoff proposing a joint venture:

"As time goes on, I expect to get a firsthand knowledge of the operation of the differential analyzer — I have already spent a bit of time watching the process of setting up and operating the thing — and with this background I hope I can outdo the analyzer electronically."

"A number of different ideas have come to me recently anent computing circuits — some of which are more or less hybrids, combining your

methods with other things, and some of which are nothing like your machine. The question in mind is this: Is there any objection, from your point of view, to my building some sort of computer which incorporates some of the features of your machine?"

"Ultimately, a second question might come up, of course, and that is, in the event that your present design were to hold the field against all challengers, and I got the Moore School interested in having something of the sort, would the way be open for us to build an 'Atanasoff Calculator' (a la Bush Analyzer) [these italics in original] here?"

Atanasoff's reply to Mauchly's letter came the next week, Oct. 7, 1941:

"I am delighted to hear that you are teaching in the Department of Electrical Engineering at the Univer-

sity of Pennsylvania, and I will be sure to get in touch with you the next time I come East, which should be in the very near future. At that time we can discuss our mutual interest in calculators."

"Our attorney has emphasized the need of being careful about the dissemination of information about our device until a patent application is filed. This should not require too long, and of course, I have no qualms about having informed you about our device, but it does require that we refrain from making public any details for the time being."

Back to original ideas

This letter closed the door to any chance Mauchly had for working with Atanasoff at the Moore School, and also, as Mauchly understood it, to revealing or building any hybrid of Atanasoff's design. Mauchly had already considered (on paper) a hybrid of Atanasoff's idea of using condensers as a cheap storage. Now, not wishing to disclose any components of the ABC, Mauchly abandoned any schemes he had recently thought of for using condensers for storage and directed his thoughts to his original (at Ursinus) ideas that were "nothing like your machine" and used only electronic elements that were not limited in their computing action by mechanical parts.

Mauchly never found out until the time of the Honeywell case that although Atanasoff and Berry worked on their calculator for another year (until September 1942), they never finished it, nor did they ever file for the patents.

In a memo titled "The Use of High Speed Vacuum Tube Devices for Calculating," Mauchly sets down the advantages of an electronic computer over any mechanical or electromechanical device. He states very explicitly in this memo that the components he had planned are "... analogous to the ordinary mechanical computing machine. ... It is intended that this analogy shall be interpreted rather completely. ... Just as in a mechanical computing machine the digits which represent various powers of 10 are added simultaneously, so in the electronic device. ... It is in every sense the electrical analogue of the mechanical adding, multiplying and dividing machines which are now manufactured for ordinary arithmetic purposes."

However, the design of the electronic computer allows easy interconnection of a number of simple component devices. ... The result of one calculation is immediately available for further operation in any way which is dictated by the equations governing the problem."

Here was the point of departure from all other computer devices. Mauchly is offering the possibility of subroutines.

Col. Paul Gillen of the Aberdeen Proving Ground suggested the name Eniac (Electronic Numerical Integrator and Computer), and this acronym was approved. The "and Computer" was to eliminate any misunderstanding about its origins. From the beginning, the Eniac was intended to be a general-purpose machine, even though Aberdeen's immediate use of it would be in the solution of ballistics equations.

Even before the final contract was signed, the Moore School assembled a group of engineers, and work on the Eniac began. ‡

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Custom Mode	Yes	No	No	No	No
Keyboard LED's	7	1	0	0	0
24th Status Line	Yes	Yes	No	No	No
2-Speed Smooth Scroll	Yes	No	No	No	No
Graphics Characters	Yes	Yes	No	No	No
Configurable Print & Send	Yes	Yes	No	No	No
Set Up Mode	Yes	Yes	No	No	Yes
Sensible Tabs	Yes	Yes	No	No	Yes
Character Protection Attributes	Yes	Yes	No	No	No
Screen Saver	Yes	Yes	No	No	Yes
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IN DEPTH/ATANASOFF

(Continued from ID/2)

its infancy. So it was perhaps natural that my mind turned to this medium in which I had my greatest expertise. The final choice was not concluded in any simple manner, however; for some time I wavered from one to the other, from mechanical to electrical or electronic systems. My engineering training had taught me to select materials and methods carefully for the job at hand, so that each time I felt inclined toward an electrical/electronic system, I wondered if I could make it — and in particular its electronic tubes — sufficiently stable.

At an early point in my thinking about digital computers, I looked at the effects of a change in the base of the number system. How would the structure of a computing machine depend on this choice? Of course, I was faced with the problem that mankind already had chosen in this matter, and if I wished to use some base other than 10, it would be necessary to convert both before and after computing.

For a time, such conversions seemed like an unnecessary complication, but I continued to investigate the matter.

I well remember how crude my first efforts were on this subject. I had once considered how a different base might affect mental arithmetic and had concluded that a base should be as large as would permit easy memory of the multiplication table. At that time, I had thought of 12, 16, 25 and 100, but was not experienced in any of these. I had also thought of 60, which historically has had a role much like that of a base, being used to measure time (hours, minutes, seconds) and angles (degrees, minutes, seconds). I did not think that a person could easily remember the multiplication table up to 60×60 , although I thought it should be possible to memorize the multiplication table up to 25×25 .

At that time, I had only a vague idea of a computing machine. I hoped that the nature of the arithmetic for the various bases would indicate which one would be most advantageous for a computer. Early in my computing career, I discovered the inclination of a computer to prefer lower bases. I became convinced that addition and subtraction required less machine effort for base $b = 2$, and this economy also tended to confirm my choice of the base 2. We shall see that memory and recording were much better with this base. Later, when I planned logic circuits, the great advantage of the base 2 was evident.

Computer memory

In looking over the 1936 art in computing, I had become convinced that a new computer should provide for a much larger retention of data. Almost from the start, I called this "memory." The word seemed natural to me, as I suppose it did to others since it is still in use in a wide field including computers. At this time, I had only a cursory knowledge of the work of Charles Babbage and so did not know that he called the same concept "store." I like his word, and perhaps if I had known, I would have adopted it; I like "memory," too, with its analogy to the brain.

Even at that stage of my thinking about computers, I had some idea of the meaning of fast memory and slow memory. Fast memory is avail-



PHOTO BY CAROLYN CADES

able at substantially the speed of the computer. Slow memory is available, but access to it takes longer. In an 80-column IBM tabulator, the only fast memory — and the largest then in existence — was contained in its internal dials, with a capacity of about 266 bits. This machine actually achieved a large memory by recording its results on cards (with a summary punch) and putting the cards back in for reprocessing. There may be an argument as to whether taking out a punched card by hand and reinserting it constitutes a real memory; perhaps we should call it a very slow memory.

I felt that the new machine I was contemplating should have a much larger fast memory than 266 bits.

I now quote from the transcript of the testimony I gave in federal court on June 15, 1971:

"Well, I remember that the winter of 1937 was a desperate one for me

because I had this problem and I had outlined my objectives, but nothing was happening. We come to a day in the middle of winter when I went out to the office intending to spend the evening trying to resolve some of these questions and I was in such a mental state that no resolution was possible. I went out to my automobile, got in and started driving over the good highways of Iowa at a high rate of speed. . . .

"I drove into Illinois and turned off the good highway into a little road and went into a roadhouse. . . .

"During this evening in the tavern, I generated within my mind the possibility of the regenerative memory. I called it 'jogging' at that time. I'm thinking about the condensers for memory units, and the fact that the condensers would regenerate their own state, so their state would not change with time. If they were in the plus state, for instance, they

My training and my way of life inclined me toward the use of electricity and electronics as the media for my computer. My principal worry was that these methods would not be as stable as mechanical motions.

would stay in the plus state; or, if they were in the negative state, they would stay in the negative state. They would not blink off to zero. Or if you used two positive charges, they would retain their individual identity and would not leak across to each other.

"During that same evening, I gained an initial concept of what is called today the 'logic circuits.' That is a nonratcheting approach to the interaction between two memory units, or, as I called them in those days, 'abaci.' I visualized a black box which would have the following action: Suppose the state of abacus 1 and the state of abacus 2 would pass into the box; then the black box would yield the correct results on output terminals."

During that evening in the Illinois roadhouse, I made four decisions for my computer project:

1. I would use electricity and

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electronics as the media for the computer.

2. In spite of custom, I would use base-2 numbers (binary) for my computer.

3. I would use condensers for memory, but "regenerate" to avoid lapse.

4. I would compute by direct logical action, not by enumeration.

Questions of stability

My training and my way of life inclined me toward the use of electricity and electronics as the media for my computer. My principal worry was that these methods would not be as stable as mechanical motions. This was a long time ago, and the control of electricity was less effective than it is now, but I was building a digital and not an analog device. A little reflection in either the electrical

or the mechanical case will convince one that digital devices do not require absolute accuracy to yield perfect results.

The base 2 appealed to me. Nevertheless, I expected to receive criticism for changing such a thing as the base of numbers. It is something like the metric system, calendar reform and changes in the alphabet; one does not do such things.

The final decision for the memory element did not come so easily. I was planning to use vacuum tubes for computing circuits, but I could not afford the amplification needed to actuate the tubes. I chose small condensers for memory because they would have the required voltage to actuate the tubes, and the plates of the tubes would give enough power to charge the condensers. In the past, I had been worried about loss of

charge in the condensers, but now with jogging that worry was gone. The actual circuits for jogging the memory required a minimum amount of time to design — a week or two at most.

The decision to compute by direct logical action and not by enumeration was still more difficult. I had merely hypothesized a black box that would do this, and nobody knew how to make such a box. If I had chosen to do the job by enumeration, I would have tried to simulate by electronic means the counting processes that have always been used in computing. But here I wanted to do something different.

I considered how I might add two numbers. I would have them enter the black box from two separate memory devices. The black box would find their sum and would sig-

nal this to a third memory device or, what is more usual, back into one of the memories that had sent the original numbers. In each case, the box would have to compute the answers to the additions or subtractions that were required.

I planned to use serial addition or subtraction — that is, to operate on numbers digit by digit. The black box, which we will now call the computing device, started at the lowest power of two and moved toward the highest power; at each power, it received the two signals for the digits to be added or subtracted. At the same time, it received the carry or borrow digit, if any, from the previous step. The logic of the system gave the answer and the carry or borrow, if any, for the next step.

The base 2 appealed to me. Nevertheless, I expected to receive criticism for changing such a thing as the base of numbers. It is something like the metric system, calendar reform and changes in the alphabet — one does not do such things.

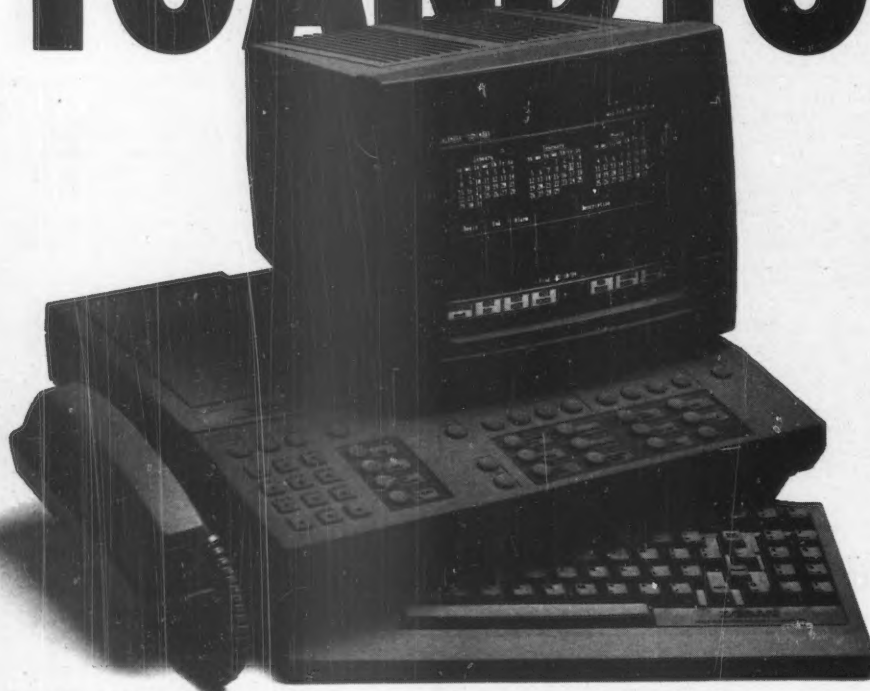
The black box or computing device was to contain vacuum tubes to carry out these operations. In designing such devices today, we would use an abstract kind of mathematics called Boolean algebra and the so-called truth table. At that time, I had studied this algebra a little, but I did not recognize its application to my undertaking, and I obtained my result by trial, at first, and then by a kind of cognition. I called my logic circuit an add-subtract mechanism. It contained 13 vacuum tubes, and in the end these were all triodes. Adjustment of the biases of the tubes would cause the circuit to add or subtract as required. By arranging for the data on one of the two memory devices to be shifted, I planned to provide for automatic multiplication and division.

I am now amazed and pleased to find that all of my four decisions relate to structures that are in use in modern computers. All computing is now done with electric and electronic means. Base-2 numbers are current on all machines. To the best of my knowledge, all machines now operate with logic circuits and without enumeration. It is true that I did not invent the modern dynamic memory, but this memory uses capacitors for memory, and the refresh cycle directly derives from my jogging or regenerative ideas.

So, early in the spring of 1939, I made an application for a grant from the dean of the graduate school. I planned to hire an assistant and to have a small budget for materials and shop work.

In selecting an assistant, I felt that I should choose an electrical engineer, since most students entering graduate work in physics did not have the mechanical or electronic skill. From my point of view, he had to be a very special engineering student. Soon after having these thoughts, I met Harold Anderson, a professor of electrical engineering, on the sidewalk in the center of the

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campus and told him of my need. He already knew of my interest in computers, and he answered in a moment, "I have your man — Clifford Berry."

Working prototype

Almost as soon as the prototype was completed, it began to work very well. The assembly procedure for the logic circuits Berry had devised made them perfect. Our visitors who understood what was going on were surprised to find so much structure giving additions and subtractions that were correct. Of course, our explanation to them had to cover base-2 number theory. Several of those who witnessed these first trials are still alive.

There is little doubt that the prototype was completed near the end of 1939. It was, of course, a crude device. It could just add and subtract the binary equivalents of decimal numbers having up to eight places. Nevertheless, Berry and I regarded this machine as a great success. It settled many doubts about how an electronic computer should be built.

1. The device was digital, not analog like the differential analyzer.

2. While the clock system was mechanical, all computing was electronic.

3. For the first time, vacuum tubes were used in computing.

4. The advantageous base-2 number system was first used.

5. Logic systems were first employed in computing.

6. All computation was done in a serial manner.

7. Capacitors (or condensers) were used as memory elements.

8. A rotating-drum memory contained the capacitors.

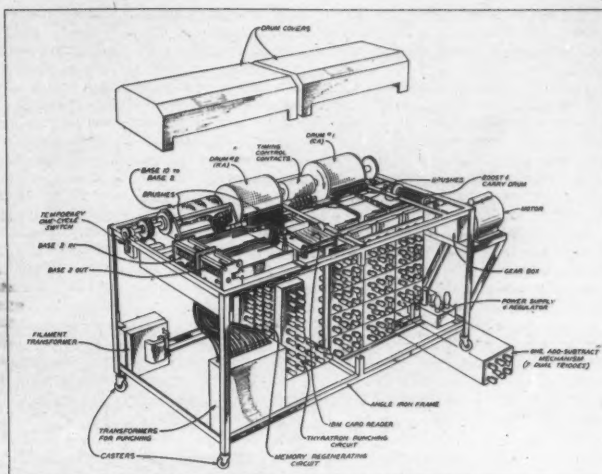
9. What I called jogging (others call it regeneration or refreshing) was first used in computation.

10. While the prototype did not shift or detect sign, the changes needed for these processes were obvious and could be immediately applied, thus providing the essentials for multiplication and division.

My years of hard study, together with some basic experimental work, had rewarded us well. We had definitely entered a new era in computing. Our prototype computer had, for the first time, proved the feasibility of electronic digital computation.

The Atanasoff Berry Computer (1940-42)

Once our prototype had proved successful, Berry and I both knew that we could build a machine that could do almost anything in the way of computation. Everyone agreed that our first priority should be to move in the direction of solving systems of equations. Much later, in the trial in Minneapolis, when I heard Sperry Rand counsel say that this was a trivial effort and the ABC was a special-purpose machine of little effect, I considered the issue again. I would have said that, yes, this was a special-purpose machine, but its "purpose" had many significant applications. Berry and I both felt that its operation would well represent the possible scope of a computer; we felt it would be a substantial first



The Atanasoff Berry Computer (ABC)

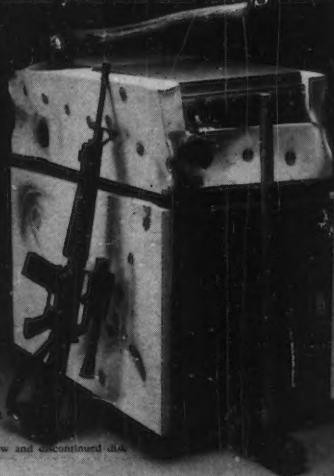
attempt that could serve as a basis for later, more comprehensive machines.

I did not know then that others had made the same choice. In a report of a government-appointed committee to consider the advisability and estimated expense of building Babbage's Analytical Engine, the committee observed that if the machine could be converted to solve large systems of linear algebraic equations, it "would place a new and most valuable computing power at the disposal of analysts and physi-

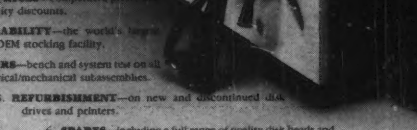
cists."

During the early years, our computer had a title relating to the solution of large systems of linear algebraic equations. About 1968, I became aware that it would be discussed at length, and because I wanted a title that would honor Berry for his extraordinary ability and effort in developing this computer, I re-named it the Atanasoff Berry Computer. If that is too long a name, we can shorten it, as many do, to the ABC. But we must remember that the computer was developed and

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constructed in the years 1930 to 1942, in spite of the date at which it received this name.

During the construction of the computer, we had tested and corrected each subsystem, and so the shakedown did not require much time except for one flaw. We had tested the base-2 card system carefully, but the number of tests was not sufficient to find an error that occurred once in 10^4 or 10^6 times. This meant that when

we tested the complete machine in the spring of 1942, we discovered that the card system was quite good, but not good enough. It was good enough that we were able to solve small systems of equations, and we could usually get an eliminant between large equations with accuracy.

We made substantial efforts to solve this flaw, including changes in the card material and careful changes in the voltages used for each

material. We sought diligently for the card material that had proved best in our earlier tests, but to no avail. All of our tests had been made on paper and cloth pulp, and we ordered cards of other material, but a good solution of this type of short memory was not found. At that time, I thought fondly of magnetic materials for this purpose, but our means would not extend so far.

The finished computer had one other possible flaw:

a round-off error. In spite of the large number of digits we had planned in each place — to wit, 50 base-2 places, or about 15 base-10 places — I was afraid the numbers would run off the paper and we would lose digits still important in the solution of a large system. My immediate plans were to change variables by a power of two, to obviate this problem after a preliminary solution had been made. Today we would employ floating-point num-

bers; we did know of this possibility, but we did not try to implement it.

The patent situation

I felt that the work we were doing on computers should be patented, and so, at an early stage, I had investigated the subject of patents at Iowa State College (ISC). It seemed clear to me that there was no firm policy on the subject.

No official pronouncement was made on the terms of a contract, or even on the necessity for a contract, until Charles E. Friley, president of ISC, received a letter from Howard Poillon of Research Corp., to which I had submitted my research proposal. In the letter of March 24, 1941, Poillon granted \$5,330, a considerable amount of money in those days, for the completion of my computer.

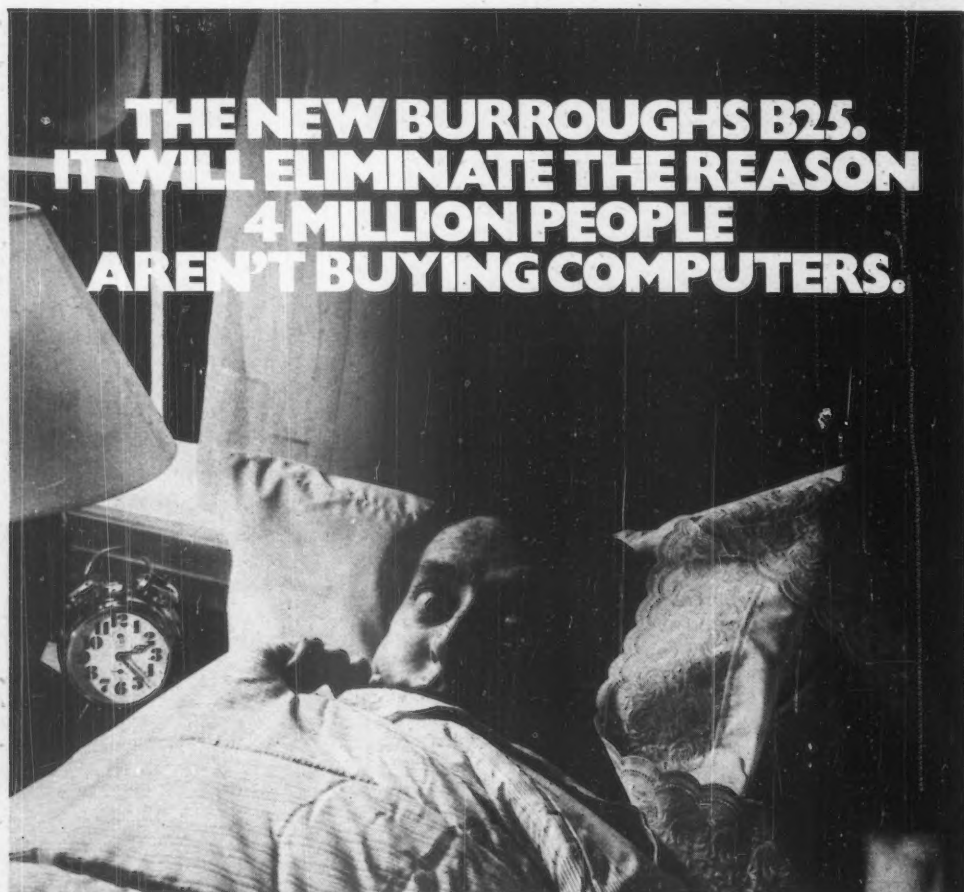
I soon heard from the ISC Research Foundation (ISCRF). The first words came to me verbally; in substance, I would not be allowed to use the grant until I signed a patent contract with ISCRF.

A patent contract was not anathema to me, but when I inquired as to the terms, someone ventured the opinion that I would get 10% of any income after all expenses were paid. I made what I thought was a small noise, but it was regarded by some as a loud one. After considerable discussion, it was agreed that I would transfer the rights to the patent to ISCRF, pay half the costs and receive half the monetary return after all expenses were paid. Almost my first thought then was for Berry. I knew that if he received anything, it must come from my share, and I drew a contract with him so that he would get 10% of my share. Later there was some difficulty in getting ISCRF to agree to this. I signed the contract with ISCRF in July 1941.

Mauchly comes to Ames

At this stage in my scientific career, I usually attended the winter meeting of the American Association for the Advancement of Science (AAAS), which in those days was scheduled between Christmas and New Year's. So, late in 1940, with my family, I turned my car eastward, and after other activities, on Dec. 26 I attended the meeting in Philadelphia for three days.

I visited what I clearly remember was a more than ordinarily dusty, chalk-filled classroom assigned to John W. Mauchly for giving a paper on an application of a harmonic analyzer, which he had constructed, to some weather phenomena. After the paper was presented, I advanced to the podium. Several people wished to



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IN DEPTH/ATANASOFF

speak with him; I was last in line. I introduced myself and started a discussion that lasted, in some form or another, until his death in 1980. I told him of my interest in computing and, in particular, in digital computing. I told him that I was building a machine to compute with vacuum tubes, which I believed would greatly increase the impact of digital computing.

He, in turn, told me of his own activities. He was very enthusiastic about his analog electrical system for doing Fourier transforms, which had been the subject of his paper. In Mauchly I met another person who was interested in computation; at that time, not many such people were around, and we talked for most of an hour in this first meeting. In the end, we shook hands and promised to write.

Mauchly made good on his promise to write. My files do not have his first letter, but they do have a letter from me on Jan. 13, 1941, answering him and inviting him to come and see me.

On June 7, Mauchly wrote that he was starting on June 10, by car. My memory is that he arrived about dark on Saturday, June 14, accompanied by his young son, Jim.

My memory is very clear that he first saw the computer with his son and my family. There was no one else around, this being Sunday, and this checks with his letter saying he might spend Friday at Iowa City. The computer was covered with a sheet to prevent dust from settling on it; I quickly removed this obstruction, and Mauchly saw the ABC for the first time. The machine was still in construction at this point. I did not turn it on, but pointed out the various parts and then covered it again to wait for Berry on Monday.

I believe that Mauchly and his son left Ames early on Friday, June 20. Meanwhile, two-thirds of our waking time was spent talking about computers. He read my manuscript and would have liked to take a copy home with him, but I did not allow him to do that. He read all parts of this description of our machine and discussed it with me.

Sam Legvold was a graduate student of mine working on another of my projects in a room next to the computer. Much later, he told the federal court in Minneapolis of Mauchly having his coat off and working with Berry on the machine, when I was otherwise employed. Mauchly took the manuscript to my home with him, and he took notes on white bond paper, which I gave him at his request.

Earlier, on May 31, I had written to Mauchly about an

idea I had formulated of using my computer in the manner of a differential analyzer. I did not know then that this concept made such a large impression on him that he would ultimately employ my idea in a computer he would help construct.

One morning during his visit, I arranged that he should lecture on his own machine, the electric analog Fourier analyzer mentioned earlier. In his entire time in Ames, Mauchly spoke only of

his work in the analog field; none of us heard the stories of counters and diodes that were told later. I remember speaking to him of nonrestoring division, which I believe I invented. This subject is also covered in my 1940 manuscript. Many years later, I found this same subject covered in claim 100 of the Eniac patent.

Mauchly and I had a most cordial relationship while he was at Ames, and after he left we still corresponded,

In his entire time in Ames, Mauchly spoke only of his work in the analog field; none of us heard the stories of counters and diodes that were told later. I remember speaking to him of nonrestoring division, which I believe I invented. This subject is also covered in my 1940 manuscript. Many years later, I found this same subject covered in claim 100 of the Eniac patent.

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IN DEPTH/ATANASOFF

though at less frequent intervals. On Sept. 30, 1941, he wrote a letter to me that contained the question, "Would the way be open for us to build an 'Atanasoff Calculator' (a la Bush analyzer) here?" In my answer of Oct. 7, I had to tell him:

"Our attorney has emphasized the need of being careful about the dissemination of information about our device until a patent application is filed. This should not require too long, and, of course, I have no qualms about having informed you about our device, but it does require that we refrain from making public any details for the time being. It is, as a matter of fact, preventing me from making an invited address to the American Statistical Association."

I do not have the exact date, but I think that early in 1943 I was seated at my desk in my noisy, dirty space in Building 184, when I felt someone approaching me from the right. It was John Mauchly. By some means, he had become employed by the Naval Ordnance Laboratory (NOL), his security clearance was satisfactory and he attached himself to my staff. I never knew the exact basis of his employment with NOL, and Royal Weller, my superior, had no more knowledge than I.

On one occasion, he told me that he and J. Presper Eckert had devised a new way to compute. I remember that I was very busy, but I paused and asked him to tell me about it. His reply was simple: "I cannot, the subject is classified." I learned later that his words were correct, and by then I knew that Mauchly could have arranged to tell me about his discovery, but he did not. For the moment, our friendly relations inclined me to believe that classification was his reason for not telling me the details of his computer.

The visits of Mauchly continued sporadically until the end of the war. As I look back over that period of perhaps three years, I wonder why Mauchly came to see us so often. Of course, he was in our employ and was paid, but he still had to travel from Philadelphia for each visit. I have lately discussed his visits with Arthur Burks, who knew of them from the Philadelphia end. I have some evidence that Mauchly knew Lynn H. Rumbaugh of the NOL staff, but Rumbaugh died before my current interest in the subject had evolved. I discussed the subject with Royal Weller. He stated that the facts were too evident: "He was watching you."

I have in my files an ISC interoffice memo concerned with the patent situation. It has no signature, but was written, I believe, by R.E. Buchanan, dean of ISC. He speaks of my saying that our computer was "probably largely obsolete." This was clearly incorrect; I spoke, instead, of the need for moving rapidly if anything was to be salvaged from our work. The memo gives no explanation of the delay in executing the patent contract between ISC and me.

Bureau of Ordnance computer

About September of 1945, while I was attending a staff meeting at the gun factory, my superior, Rumbaugh, told us that the Bureau of Ordnance was going to build a computer. Of course, the Research Department would do the work. It was over three years since I had left computing at ISC, and I had not spoken much of

John von Neumann was extremely interested in computers, and he came to see me and to talk to my staff. For the first time, I found someone with whom I could discuss the basic logic of computation, and I learned a great deal.

this part of my history; it was known, however, and so I was selected to head the project. I remember saying that I would agree if the bureau were in earnest and if I would be relieved of my other duties. I knew that the computing field had reached the stage where something substantial had to happen.

While we were in this dilemma, Mauchly came to see us for the first time in several months. In the last years of his life, he claimed that on

this occasion I asked him how to build a computer. I do not remember doing this and do not believe I did; in any case, I do remember that as always, we talked of many things, but I heard nothing from him about computers. He also said later that we asked him to help us write "job descriptions." This was likely, because it was the way we established positions into which we could hire personnel for the government.

We had received general informa-

tion on the Eniac development, but not the details. I still had in mind that Mauchly had stated that his project was classified, and we started a program to secure these details through either declassification or the "need to know" basis, which we now could use.

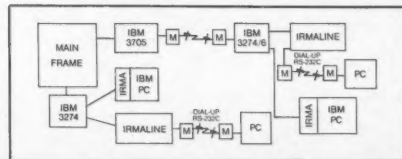
At the same time, I knew that the field of computing was in its infancy, and I sought to lay a foundation for a program that would take some time, but would train us all toward the future of computing.

I had another source of information. John von Neumann was extremely interested in computers, and he came to see me and to talk to my staff. We had met before, and he entered this subject with supreme self-confidence and many good ideas. For the first time, I found someone with whom I could discuss the basic logic

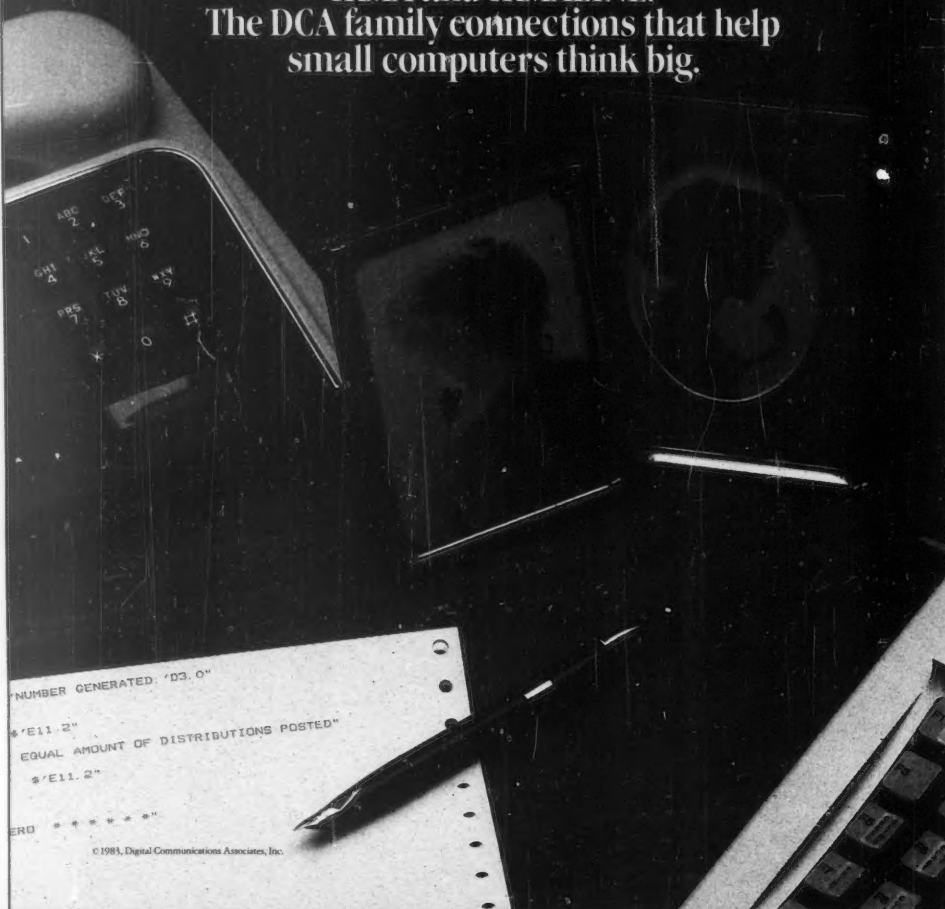
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IN DEPTH/ATANASOFF

The trial in the Eniac case ended on March 13, 1972. Larson signed his decision on Oct. 19, 1973. The decision should have received major coverage, but the press was occupied with other matters: Oct. 20 was the date of the "Saturday Night Massacre" of Watergate fame.

of computation, and I learned a great deal.

Formal litigation

In the matter of computer litigation being considered here, there were only two cases at that time: the Memory System case and the Eniac case; even so, the legal documents numbered in the thousands.

Mauchly's deposition was taken

on behalf of the defendant, Control Data Corp., in the suit by Sperry Rand Corp. on the Memory patent 2,629,827 and certain other patents. My work on computers, with Berry's assistance, was of concern because I had developed the process of jogging the memory (regeneration) to prevent loss from time or use.

By the time of the deposition, counsel for CDC knew that the ABC

used jogging or regeneration, and a principal part of the deposition was to interrelate the Memory patent '827 with my work, which Mauchly had seen on his visit to Ames. In

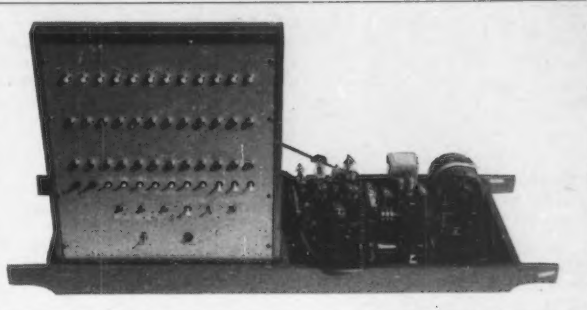


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answering general questions about with whom he had worked, Mauchly avoided discussing his trip to Ames or me until the second day of his deposition. He then told of our meeting and of my asking him out to see my machine, but did not mention the correspondence between us.

He spoke of being cordially received, but hinted that no one was willing to tell him all about the machine. He claimed that nothing worked except the motor. There was no demonstration of the action of the machine, he asserted.

He said he had no time with the machine — perhaps a half hour; later he said perhaps 1½ hours.

He saw one cylinder of condensers, he said. He learned that memory was retained by the use of regeneration, but said he was not told how the regeneration worked.

There were some tubes, he said, but he was not told how they worked.

He said he was told the machine worked on numbers to the base 2.

A considerable portion of the time during his visit was spent on his Fourier (harmonic) analyzer, he claimed.

He said he did not make any notes of his visit to Ames.

Was there any written material? Well, maybe. Did he have it in his hands? He was not sure.

He said that maybe the Eniac used regeneration; the Edvac and the Binac, both of which he and Eckert had patented, certainly did.

Did he sign a patent application and receive a patent that would prevent Atanasoff from building and operating the computer Mauchly saw in Ames? No, he said, he did not.

Points of difference

These answers were mostly at sharp variance with what I have reported in the present article concerning Mauchly's visit to Ames. They were also contradicted by the testimony of the various witnesses to that visit.

Now Mauchly claimed he did not write any notes during his visit to Ames, and it is possible I might not have remembered so certainly that he did, except that he arrived without any paper and asked me for some. I always had stacks of white unlined bond paper on hand, and I provided some for him. I recall this particular circumstance of his note-taking clearly, in addition to the note-taking itself.

Mauchly's own testimony was self-contradictory at times. He admitted, for example, that the ABC used regeneration and stated that he did not wish to prevent Atanasoff from using such a device, at the same time that he agreed he had signed a patent application covering regener-

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IN DEPTH/ATANASOFF

ation and did, in fact, secure such a patent. Yet the purpose of patent claims is to get letters patent that prevent others from doing what the claims cover — in this case, prevent the use of such regenerative devices as I had built in my computer.

Larson's decision (Oct. 19, 1973)

The trial in the Eniac case ended on March 13, 1972; it had taken 135 days or parts of days.

Larson signed his decision on Oct. 19, 1973. The decision should have received major coverage, but the press was occupied with other matters: Oct. 20 was the date of the "Saturday Night Massacre" of Watergate fame.

The judge found 17 specific claims on the Eniac patent invalid on a variety of grounds, including two claims taken to be representative of the subject matter derived from me by Mauchly

and Eckert. He found the entire patent invalid on three grounds unrelated to invention: public use, on sale and published disclosure, all more than one year prior to the Eniac patent filing date of June 26, 1947. He also found the entire patent invalid on the ground of derivation from my prior electronic digital computer. I will now quote relevant passages from Larson's decision, beginning with the court's version of the derivation of

the Eniac invention from me:

The subject matter of one or more claims of the Eniac was derived from Atanasoff, and the invention claimed in the Eniac was derived from Atanasoff.

Eckert and Mauchly did not themselves first invent the automatic electronic digital computer, but instead derived that subject matter from one Dr. John Vincent Atanasoff.

Between 1937 and 1942, Atanasoff, then a professor

of physics and mathematics at Iowa State College, Ames, Iowa, developed and built an automatic electronic digital computer for solving large systems of simultaneous linear algebraic equations.

Prior to his visit to Ames, Iowa, Mauchly had been broadly interested in electrical analog calculating devices, but had not conceived an automatic electronic digital computer.

As a result of this visit,

I realize that even a person with some legal and/or technical understanding might have difficulty grasping the contribution of my computer to the Eniac. In certain features of the two machines, however, it is hard to believe that this applies to Mauchly and Eckert.

the discussion of Mauchly with Atanasoff and Berry, the demonstrations and the review of the manuscript, Mauchly derived from the ABC "the invention of the automatic electronic digital computer" claimed in the Eniac patent.

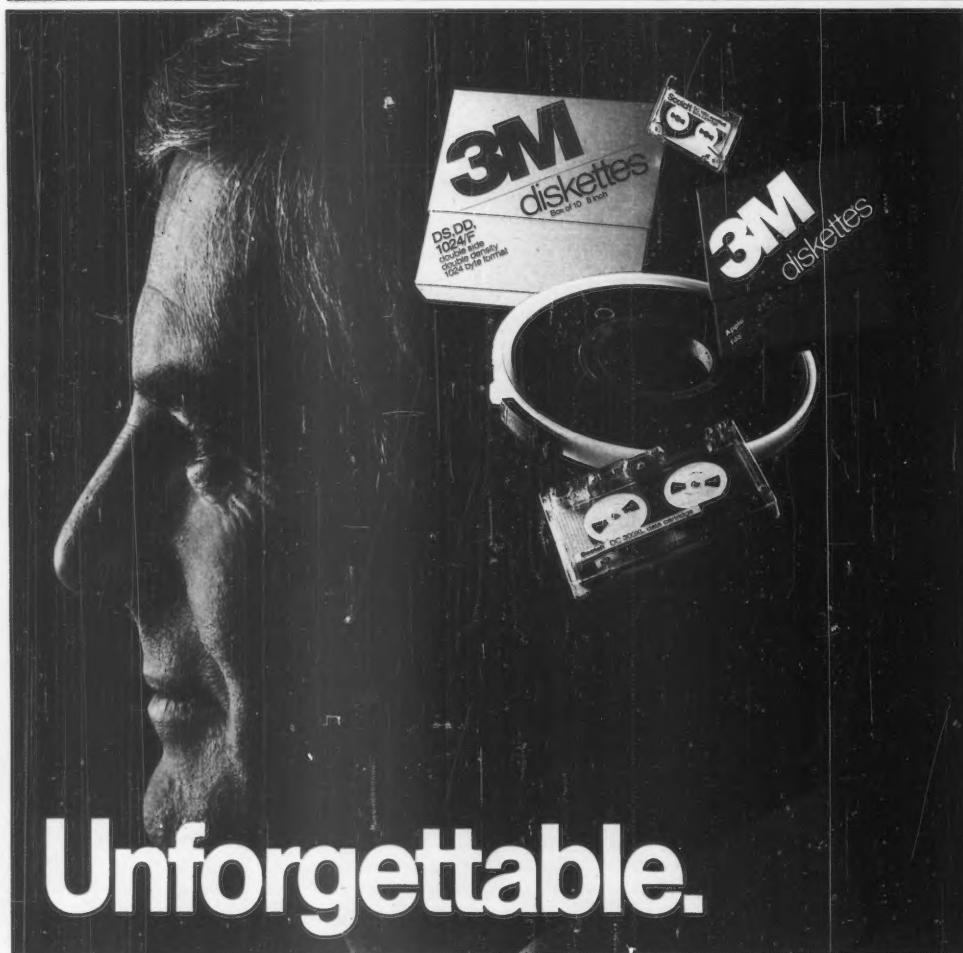
After thus spelling out the conduct of Mauchly and Eckert in regard to me and my work, Larson presented the other side of the picture, including a lack of action by me, and found Honeywell not entitled to antitrust damages for willful and intentional fraud on the Patent Office:

The ABC was described in a definitive manuscript and a draft patent application specification which was prepared by Clifford Berry but, because it was never filed, the Patent Office had no means by which it could have become aware of the ABC or of Mauchly's prior knowledge of the ABC.

M[auchly] may in good faith have believed that the monstrous machine he helped create had no relationship to the ABC or Atanasoff.

The court finds and concludes that despite the various derelictions of M[auchly] and E[ckert], defendants and their counsel that the claim of willful and intentional fraud on the Patent Office has not been proved by clear and convincing evidence.

I realize that even a person with some legal and/or technical understanding might have difficulty grasping the contribution of my computer to the Eniac. In certain features of the two machines, however, it is hard to believe that this applies to Mauchly and Eckert. A good example is Eniac



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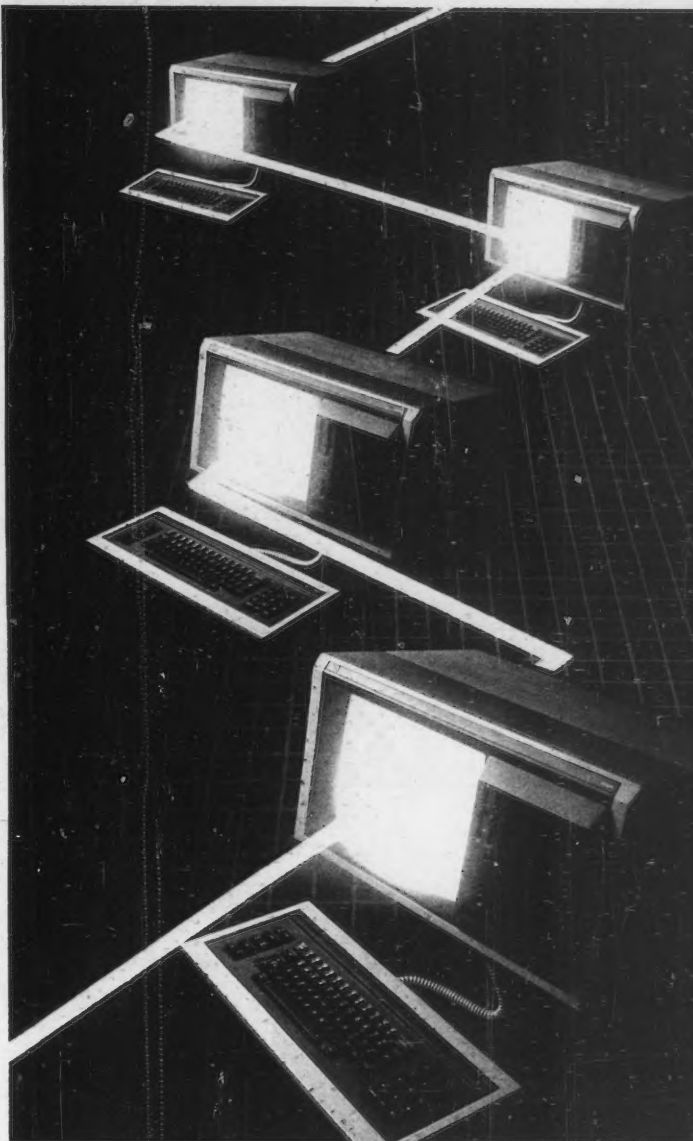
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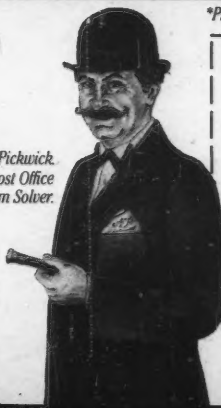
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IN DEPTH/ATANASOFF

patent claim 100, a claim covering an electronic version of the nonrestoring method of division. I do not recall any discussion of it during the trial, but in reading this claim at a later date, I noticed that it looked familiar. I recalled that I had discussed this feature of my computer with Mauchly when he was in Ames. The same feature was also revealed in my August 1940 manuscript, which Larson ruled Mauchly had read while in Ames. I find it hard to believe that my concept of nonrestoring division could have inadvertently become claim 100 in the Eniac patent.

I find it just as difficult to believe that in the case of the Memory patent, Mauchly and Eckert did not know they were employing my principle of jogging or regenerating ("refreshing") the memory — a principle also explained in my 1940 manuscript and a conspicuous feature of the machine.

I must also comment on Larson's findings that if I had filed a patent application for the ABC, my work would have come to the attention of the U.S. Patent Office, and that because no application was filed, the Patent Office had to act without awareness of Mauchly's knowledge of my contribution.

I cannot quarrel with the judge for this ruling, used by him to support a conclusion of no fraud on the Patent Office in regard to Mauchly-Eckert conduct toward me. For the record, however, I should observe again that I was forced to sign an agreement with ISCRF in order to build my machine, and ISCRF did not uphold

its end of that agreement. I should also reiterate that Mauchly failed to reveal either to his counsel or to the Patent Office any contact with me and my work.

Everyone expected that Larson's decision would be appealed, but it was quickly settled by the payment of money and an agreement between the parties that each would support the judge's decision of 1973. I have been told that Sperry Rand paid \$3.5 million — sufficient to reimburse Honeywell for the cost of the trial. Thus ended this important case.

Enough honor for everyone

In retrospect, I am very sorry that Iowa State College did not patent the work done by Berry and me. Looking back, I would ask a federal court to discharge ISC from our patent agreement and I would then patent the material myself. However, I will never again be in a position to do that. I also regret that Mauchly and Eckert did not inform their counsel about our work. I believe that if they had done so, they would have received a valid and valuable patent for the Eniac, assuming they had met all the other requirements for a patent application.

Distinguished men have said there is enough honor here for everyone, and I agree with this.

In view of the expensive and extensive Eniac trial, I expected that it would result in an appeal to the Supreme Court. When there was a settlement instead, together with an agreement to support the judgment, I expected that the agreement would

be honored. There has, however, been continual opposition to, or ignoring of, the order for judgment from a variety of sources.

Perhaps the most obvious example was a two-page center-spread ad in the *Wall Street Journal* of June 5, 1979, in which Sperry Rand photographed Eckert and the Eniac and stated that the Eniac was the "first electronic digital computer."

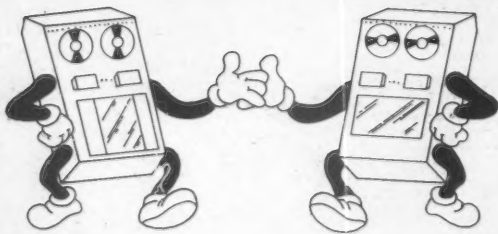
Eckert and Mauchly also continued to talk publicly and to write just as they did before Larson issued his decision. Late in 1975, I received an invitation to speak at a conference on the history of computing in Los Alamos on June 10-15, 1976. I realized that this would be an important occasion, and I wished to attend, but a health problem prevented my going. When I read the paper given at that conference by Mauchly, I was

disappointed to find him repeating many of his previous contentions.

Mauchly made much of his alleged effort "to persuade Dr. Atanasoff that his projected machine did not realize the potential speeds of electronic calculation that I had in mind." No such persuasion was attempted, and Mauchly's own correspondence after seeing my computer makes clear his favorable impression of it. He certainly did not speak to me of high-speed counters, and again his correspondence reveals that he thought my computer would be very fast — as it was for its time.

Mauchly plainly thought that my computer was just wonderful. All of his objections to it were raised years later, and I am obliged to conclude that they represented a stand he had decided to take publicly to strengthen his own claims to invention. ‡

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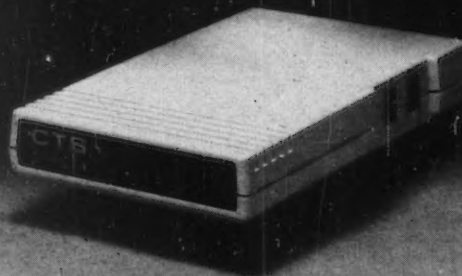
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A futurist looks back

By Charles P. Lecht

It was late 1975, and I was alone in my windowless chart room studying and updating its displays, when I realized that something truly unusual was about to seize the entire computer industry.

I understood that the recently plotted data, which deviated from expected norms, was not anomalous, but rather, indicative of radical new trends. Traditional 15% growth rates were being replaced by 30%, 40%, even 60% increases in many emerging, key technologies. Similarly, decay curves of residual product values, classically below 20% per year, were now passing that level and climbing. During the 1970s, the onrush of minicomputers and the sudden discovery that large-scale integrated chips could be reliably manufactured provided the major stimuli for these developments.

I had trouble believing what I was seeing. The charts seemed to go wild, as though they were all, in unison, exhibiting the instability of a churning sea, the kind that provides us with anticipation of a brewing storm. The plotted data curves actually resembled the outlines of waves, steeply climbing, then diving, and with ever greater frequency and amplitude. Some data, adding to the incline of a still building wave, gave promise that its track would soon transit the top of the page on which it was plotted with



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heroic perpendicularity. Other data revealed its intention to provide a slope that would plunge precipitously through the bottom border of the chart, ignoring the scale that I had confidently expected to suffice for years.

Product life cycles were shortening, greater numbers were being introduced, prices were dropping, and foreign influence in our marketplace was growing in 1975. Accelerated depreciation schedules forced by continuous devaluations in the if-sold values of inventories were beginning to test the mettle of some of our computer industry's heartiest competitors. Others, such as IBM, were strong enough to alter their course in anticipation of what was to follow.

This pattern was clear from charts that traced price/perfor-

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mance in the most basic system component technologies: the CPU, I/O devices, controllers and memory. For, visually, their curves betrayed no mere mounting storm but one already raging. It was also clear that we were headed for a technological hurricane.

That was the forecast of *The Waves of Change*, my curious book first published in part in *Computerworld* during 1977, and fully by McGraw-Hill Book Co. in 1980. I was

convinced that the process of creating it would reveal the future of our industry to me and, if I was right, to others as well.

Until these revelations were made, such information would remain the guarded knowledge of investment institutions and our largest corporations, who have every right to its collection and protection. Only on Wall Street and in Washington, D.C., places where the din of traffic is exceeded by that of human chat-

ter, is this guard let down on all fronts.

The Waves of Change resulted from a feverish hunt in both of these communities by many people — feverish because keeping current in our field is like bicycling to keep up with an accelerating train. What made it possible were the periods, however brief, when a free ride became possible through a direct connection to the train itself — afforded by linking to a corporation's private coach.

But the rewards of pedaling hard and hanging on were worth it; you got to keep up and look in on things rather than have them fly by unnoticed. And as I did, breathlessly, what I saw unfolding was awe-inspiring and beautiful; no single train of events was revealed, but rather, more than could be counted. The myriad switches between tracks, allowing each to intersect with the others, inevitably resulted in numerous business collisions. A not infrequent handcar could be seen in the distance, with executives-turned-hoboes, victims of wrecks further down the line, pumping like mad to catch up again.

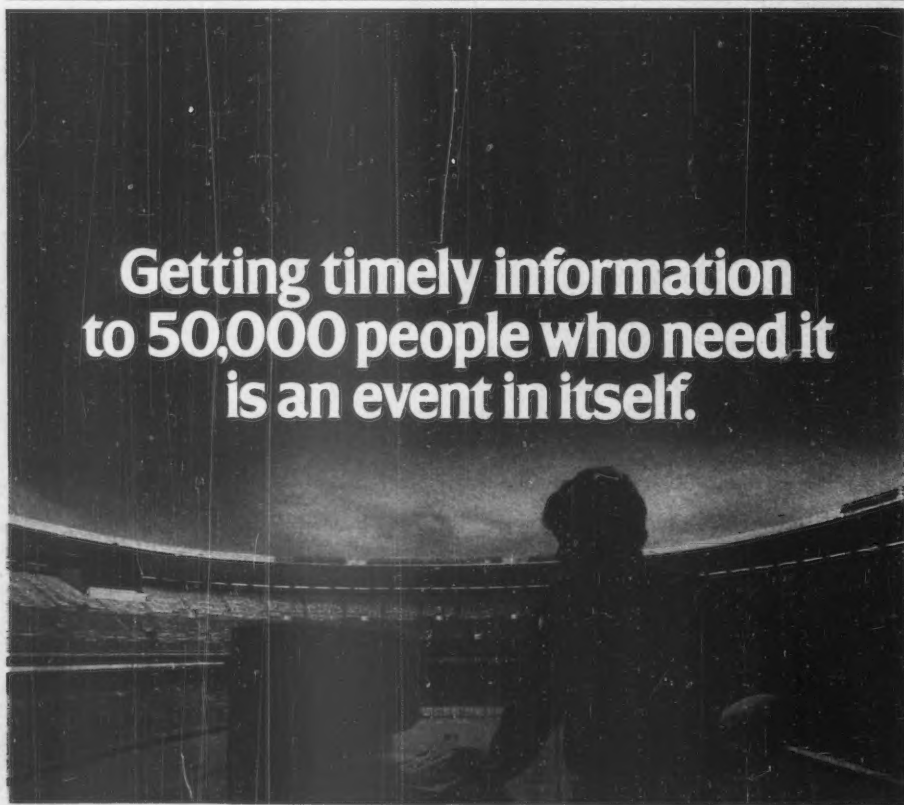
Toward a black hole

The entire computer industry was racing, hell-bent for leather, headed into an era of unparalleled change. The meters by which its pulse had always been measured showed it occurring, and accelerating to boot. In my chart room, I felt as if I were Captain Kirk at the helm of an enterprise being pulled inexorably toward a black hole. A view of what it would be like in the universe on the other side was the object of my speculation in *The Waves of Change*.

While in retrospect some of the book's forecasts have strayed from the mark, I am proud of the accuracy with which it predicted today's computer industry. I said that by 1980 we would have come full circle to the concept of "a computer for every user." I described the emergence of an information services industry which, under the umbrellas of massive service bureaus, would tomorrow dispense most of the powers engendered by computer systems, just as telephone service or electricity is dispensed today.

In fact, I concluded that our computer industry would evolve along the lines of the electrical power industry, albeit with some key differences. Heretofore discrete systems would ultimately be sewn together by cable and, unlike electricity, broadcast, too.

Massive public utilities would be formed that would, because of the economies of scale achieved through them, lessen our attraction to local computing power when important processing or tight security is required. Except that this time, the kind of bipolarity that placed only minuscule electrical power generators in today's user facilities (for example, in tools, pumps and so on) and massive ones (nuclear power plants and the like) in the utilities would not occur. Rather, our data processing devices would be deployed to service users in an ever-varying pattern of overlapping networks of multiclass systems devices. Each network, at once a computer and a communications system, would provide integrated digital services: from the processing of the simple few-bit messages in a burglar alarm



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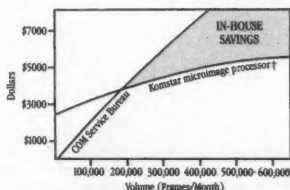
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to those of high density required for video and everything in between, and would allow for run-time, ad hoc configuration of its components into subsystems providing a great variety to their utility.

The first chapter of *The Waves of Change* was *Computerworld's* first In Depth article [CW, April 18, 1977]. The piece was prepared in America's Bicentennial year, which was also the 25th since the first general-purpose computer was installed by the Bureau of the Census. The article tells of the fantastic success that our industry achieved in the invention and continuous improvement of the world of systems we've created. It drives this point home at the very start by noting that the price/performance ratio of computer systems steadily declined from 1951 to 1976, providing a 200:1 improvement.

If 100,000 calculations could be purchased for roughly \$1.25 in 1952, by 1975 these would cost roughly one cent. And the price was headed downward ever faster, to half a cent in 1977. By 1985, it will be one hundredth of a cent, or 10,000 times less than in 1952. If this reduction had been achieved in transportation since 1952, the price of an airplane ticket between Washington, D.C., and Chicago would now be less than a local telephone call. The economies that technology has returned to its users are unparalleled in history.

Not as expected

Some of my prognostications, however, did not turn out to be as accurate. I forecast the impending entries of AT&T into the computer industry and IBM into the communications field, which was dead-on all

right. But I thought this would trigger a gigantic battle for marketplace share, even one of *Star Wars* proportions. Looking back, I should have known better. Each, freed from dealing with the Justice Department any longer, would indeed enter the other's domain — but not as warrior. Rather, common sense dictated that they had more to lose by competing than by cooperating and, wouldn't you know it, they made love, not war. Now I'm not implying that this was illicit love. As in *Lina Wertmüller's Swept Away*, a film in which a lady and her servant are marooned on a desert isle, it was the only reasonable thing to do.

There are other forecasts that I similarly regret. Possible mergers, the use of bubble memory and charge-coupled devices, and my optimism on the usefulness of natural

languages to supplant our synthetic ones stand out as ugly specters I must confront. I console myself with the knowledge that in a book containing so much, it would be a miracle if all was correct.

The Waves of Change was written shortly after IBM announced its intention to drop its long-standing project called Future Systems. There were then no real microcomputers; minicomputers and distributed processing were the vogue. Data General Corp.; Hewlett-Packard Co.; Digital Equipment Corp.; General Automation, Inc.; Interdata, Inc.; and a flock of other companies were growing, and there was no end in sight — none, that is, if you weren't looking too carefully.

Mainframes were growing at an annual rate of 15%, minis at 25%, and an upstart business called microcomputers literally leapt from nowhere to start growing at 40%. Advanced Micro Devices, Inc.; Mostec, Inc.; Motorola, Inc.; Fairchild Camera & Instrument Corp.; Texas Instruments, Inc.; and National Semiconductor Corp. were on the long list of micro companies attracting attention as chips became practical. That this growth would result in a robust low-end marketplace was clear. But no one then realized that it would happen as soon and as fast as it did. I forecast that mini/micro products would not severely affect our major mainframe business, and this prediction, in my opinion, turned out to be correct.

That today's large mainframe business is as robust as ever, though with fewer contenders, attests to the accuracy of this forecast. True, mini and mid-range systems sales have weakened in the past year, but I believe that is the result of marketplace confusion and manufacturer inability to cope with the ever-accelerating change. As the engines of the industry roar by, many minicomputer makers appear to have jumped the track, derailed by the dilemma caused by the rapid-fire introduction of new terminals, where each new successive issue brings such price/performance improvements that, ultimately, their power is bound to exceed the mainframe to which they are attached.

Watershed for manufacturers

Like a long line of breakers, these innovations crash repeatedly on the beach of the mini marketplace, eroding its economic viability. The terminal marketplace as we've come to know it has been a watershed for manufacturers who confronted it with a built-in customer base for their products — but a Waterloo for those without one. This shoreline has also become the point of entry for many hack companies which, by price-cutting and dumping, have waded in to catch the cresting wave and gain a market share — or simply to stay afloat.

That minicomputer products are increasingly indistinguishable from personal computer and terminal products has curiously provoked the mini manufacturers to attack by announcing micros rather than defending their own domain. It sometimes seemed as if, like sharks, they detected a bloody presence in these troubled waters and desperately searched for its source, without ever realizing that the blood was their own. I believe their reaction will prove to be a strategic error.



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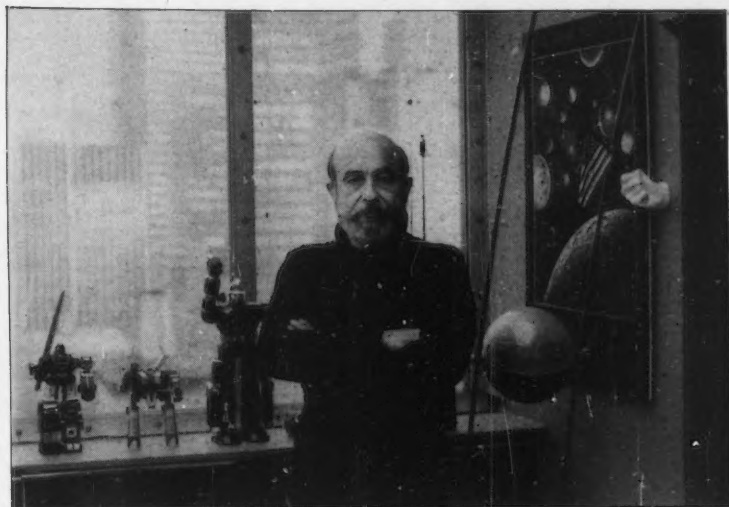


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It's going to get harder to find much room for profit at the personal computer and lower levels in view of the ever-growing presence there of IBM, Apple Computer, Inc. and now, AT&T. Emerging competition will likely be able to gain no more than a temporary foothold, except perhaps in highly specialized vertical markets.

For even if a new company could introduce a personal computer/terminal product and profit from it, the company would soon find itself spending more than it could earn to combat our larger computer product/service companies. Those larger companies would succumb to the temptation to give their personal computer/terminals away as a bonus for signing with their systems (such as IBM's Information Network or AT&T's Advanced Information Services).

Even now, major banks have seen the wisdom of giving away network-compatible personal computer terminals in lieu of electric blankets as a depositor's "gift." IBM and Apple have been no slouches in this arena either, as a steady stream of their free products flow into user hands under various banners with various purposes served. AT&T will surely follow suit, starting with the telephone — updated, of course.

Why no strategy?

It's equally hard to comprehend why the mini manufacturers didn't adopt a strategy that would, at the very least, allow their products to remain just where they had been before: namely, between the desktop microcomputer (however powerful) and mid-range systems (which have now surpassed yesterday's top-of-the-line large-scale power). This approach, while admittedly no easy stunt in our convoluted marketplace, would have given them more time to adopt a strategy that didn't presume that they could successfully fight on the personal computer/terminal front.

The fight to deliver computer systems power will be won by the companies that articulate its issuance best, using cable, broadcast, networks, mainframes, midis, minis, supermicros, micros, micro-micros or what have you. Redefining the roles of the mini and the midi has not been as easy as it has been at the top and

bottom during these turbulent times; but what goes around comes around, and we can soon expect a period when in-between systems will once again receive our attention.

Unless mini/midi computer systems manufacturers can become capable of extending their businesses — either alone or in a cartel — to include a wide variety of products and services, they would do well to get on with finding a new niche in our emerging technological environments. According to the picture of these new environments I will later paint, this won't be too hard to do.

IBM lines

The forecasts in *The Waves of Change* regarding the IBM product lines were among its most accurate. For example, the book predicted a short life span for the 30 series, a radical departure in architecture for its successor and just about every other major announcement Big Blue would go on to make in the five years that followed the book's publication. To point to where these developments were leading us, I envisioned a generalized future system architecture in a section of the book by the same title. All the good things we wanted that led to increases in power were included and distributed; intelligence would appear when it was intelligent to apply it.

The future system's veins and arteries now extended beyond the computer room; they could reach out and touch anyone, and the system revealed itself as an embryonic version of what we would later come to call the Integrated Services Digital Network (ISDN). Although it was described as a computer system, it was a communications system, too. I remember musing that General Electric Co.'s management would no longer have to don Cheshire-cat smiles or waltz around the fact that since the first day its time-sharing business opened, it had provided subscribers with an incredibly cheap alternative to the telex. No more dramatic evidence was needed to foresee the complete synthesis that our computer and communications industries would undergo.

While I was too optimistic on the date of arrival of the bubble memory as a practical, low-cost secondary storage that would ultimately replace disks, at least I didn't predict

(although I considered doing so) the ultimate in random-access memory to which we aspire — a memory so large that its attendant systems will die before it has been filled up.

Anyway, the message was clear. It was no longer an "ooh and aah" event to make a computer do just about anything we wanted it to do; rather, the question was: What did we want? To my lights, this kind of decision is the crux of the issue these days, for our technology is becoming everywhere applicable.

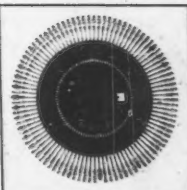
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Then the book considered the emergence of something — again from ubiquitous IBM — called "System 80," a network of heterogeneous processors, memories, terminals and just about anything you wanted. It was at once a communications system, a computer system, a data gathering device, a publishing system and so on. I thought of it as a corporate information processing machine capable of spreading its powers widely enough to support just about anything in commerce and science,

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much as our space flight control center in Houston might routinely support a shuttle mission.

And in its special-process engines, there was the capability to run old programs, so that in a literal sense, the system was deployed not only physically but temporally as well. No conversions of old programs were required, since all could run within the new system. The system could also host older processors if need be. So powerful were its higher level languages going to be that the task of re-creating applications would be far less difficult than it is today — if re-creation was desired. Powerful facilities like Forms by Example and Query by Example linked to massive relational data bases would provide all the power we needed.

System 80, as I saw it, was one of ultimate generality. But in envision-

ing it this way, I constrained its design unnecessarily; were I to recast it today, its architecture would include systolic subsystems, parallelism and more process control and graphics display facilities than are apparent from studying *The Waves of Change* diagram. Interestingly, offerings in the past five years have, in my view, confirmed System 80's architectural principles — as laid out in *The Waves of Change* — as sound.

But the next five years will see a better mix of processor architectures — linked, to be sure, in a network capable of communicating as well as processing. Each processor will be designed with a particular problem's solution in mind, and, to the degree that we can, we will strive to eliminate the processors' general-purpose nature. It's strange to think that after so many years of believing that

the benefits of a general-purpose computer system could be found in versatility, we've now decided that the same benefits are best found by emphasizing specificity. But think about it; products from every maturing technology exhibit this trait.

In view of the virtuosity needed to create and maintain modern systems like System 80, it was clear from the start of the book's preparation that very few companies could make it; possibly only IBM, AT&T, Control Data Corp. and perhaps one or two others. That's why it has been a long time since we've heard anyone announce the intention to compete head-on and across the board with IBM... except by innuendo.

Actually, Univac, IBM's strongest large mainframe competitor for most of the history of our computer industry, was the last such American cor-

porate hero to announce its intention to do so. Amazingly, its last major announcement involved a product called "System 80." Anyway, the absence today of anyone willing to announce across-the-board intentions of competing with IBM, and seriously meaning it, reflects, in my opinion, an increase in the sobriety of high-tech corporate management.

The idea that any and every digital computer is, in a sense, an ISDN as well as a terminal to other ISDNs,

This scenario just begins to suggest possibilities for systems technology, as manufacturers pronounce the general-purpose digital computer obsolete and start to address specific needs through specific-purpose digital solutions.

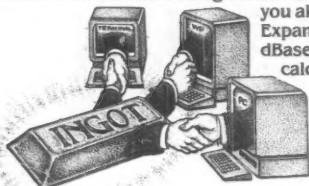
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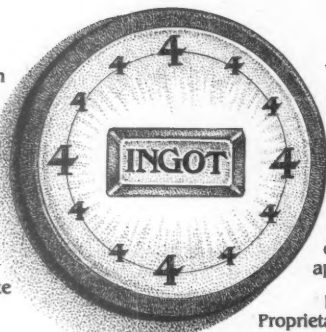
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first occurred to me while I was writing *The Waves of Change*. During my speeches on the book, I used to ask audiences to imagine that they were the size of a microbe suspended above a microprocessor chip. What they would see is what an astronaut suspended in space might see looking down, say, at AT&T's North American ISDN, or what an engineer sees when looking at the open cabinets and masses of cables inside a supercomputer. Now I don't mean to say that these views are exactly the same. Rather, they are "substantially" so. St. Thomas Aquinas, after he had stripped them of their accidental differences, would surely have reached this conclusion.

All through the preparation of *The Waves of Change* manuscript, I was heavily influenced by this idea. I saw the marketplace for computer systems as being so vast that opportunity lay everywhere. I surmised that as the concept of a cell is basic to our understanding of the general model of living organisms, so might the concept of an ISDN serve to aid our understanding of computer systems, whether on a chip or consigned to massive facilities: the kind that span not just the vanishing surface of a chip, but the sands of America, from which those chips are made. From this beginning, I reasoned that all systems products and services would ultimately start to appear similar; first within each of the classic categories of personal computer, mini and so on, and then across these, from smallest to largest.

That this is happening from the user's perspective is patently clear. Because products are becoming increasingly similar everywhere, we will cease thinking of our systems under the inane banners of micro, supermicro, mini, supermini, midi, large, very large and super — categories that hint of their origin in soap commercials because they concentrate on the power they pack rather than the kinds of problems they can solve. Up until now, computer systems — like soap — left the ultimate act of their application to the purchaser. New systems will relieve the purchaser of that responsibility. Because of the way computer systems' power is flogged in much of our advertising — and perhaps because of our disposition to let

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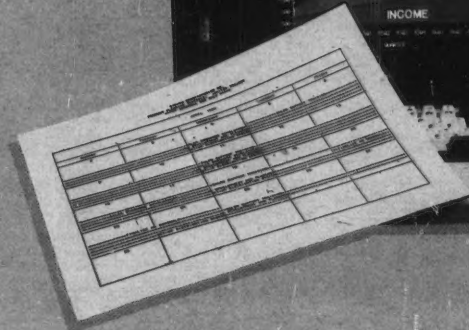
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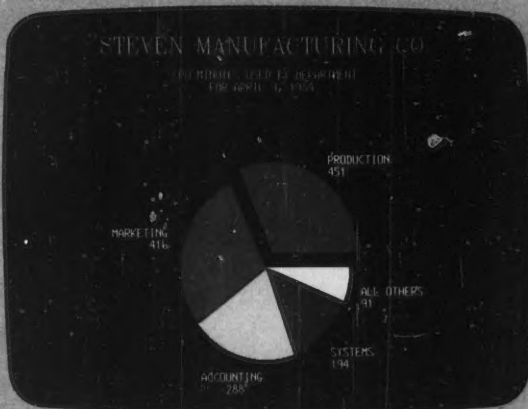
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ACCOUNTING	100	10	10.00	100	10.00	100	10.00
SYSTEMS	100	10	10.00	100	10.00	100	10.00
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IN DEPTH/A FUTURIST LOOKS BACK

Because products are becoming increasingly similar everywhere, we will cease thinking of our systems under the inane banners of micro, supermicro, mini, supermini, midi, large, very large and super — categories that hint of their origin in soap commercials because they concentrate on the power they pack rather than the problems they can solve.

sleeping dogs lie — most of today's systems are still sold under classifications of potency, avoiding mention of application. But an increasing number of systems are beginning to reflect the high degree of specificity I mentioned as desirable earlier, and these products are being defined and redefined through swiftly emerging alliances between high-tech companies and other kinds of businesses.

For example, IBM and

Merrill Lynch constitute an enterprise of incredible financial intelligence. Could anyone doubt the high degree of specificity that will be vested in the products of their joint venture? Are these not computer products? With each company's expertise adding value to the issue of the other, together their offerings will provide us with a degree of specificity in financial data processing of formidable (to their competition) proportions.

You can expect all our other service industries to follow Merrill Lynch's example as they try to modernize to keep up. The result will be that combined ideational and material products will emerge where before only ideational products stood. For example, think of a computer/insurance company duo, which, while selling insurance, also offers a worldwide navigation service for its maritime clientele, terminal and all. Or a computer/bank company duo now selling terminals on which catalogs of items — some financial, some consumer-related — can be found . . . items you can purchase automatically through the bank's data processing system.

This scenario just begins to suggest the possibilities for our systems technology, as our manufacturers — aided by other industry arrangements — pronounce the general-purpose digital computer obsolete and start to address more specific needs by issuing specific-purpose digital solutions.

Of course, not all general-purpose systems technology will vanish. For one thing, the concept, as such, will persist within computer systems manufacturing organizations, which, for their own business reasons, will still try to seek the greatest generality possible within their products. But to the user who seeks greater and greater specificity — if only to eliminate the need to program — the same product will appear to be many . . . a result of its being repackaged in many different application-specific formats.

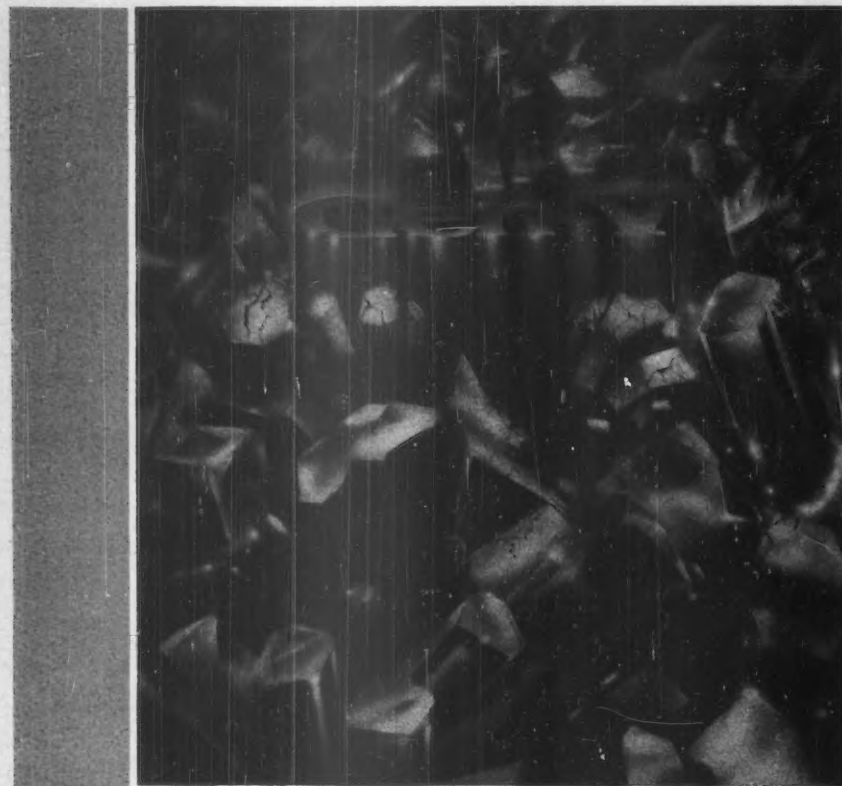
Where the computer industry was and where it was going were jammed into *The Waves of Change* on the fly during its partial publication in *Computerworld* in 1977. Creating a book this way sacrifices thoughtful expression for currency of material, an action both dangerous and exhausting.

In the "dangerous" category is the possibility that something has been expressed badly or is just plain wrong. But exhausting as the experience was, taking the time to look into what was happening was worth it.

And I'm going to do it again, soon.

About the author

Charles P. Lecht is founder and chairman of the board of Lecht Sciences, Inc., a New York-based think tank specializing in computer and communications systems technologies. He has contributed to 15 journals in eight countries. He has appeared on the MacNeil/Lehrer Report, 20/20 and the Barbara Walters Show. Lecht was recently re-elected to public membership in the Hudson Institute, the policy research organization.



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IN DEPTH



ILLUSTRATION BY JON MCINTOSH

What if they gave a trade show and too many people came?

By Elizabeth Morse

Assistant Editor, Features

Traffic backed up, parking space was unobtainable, reservations for hotel rooms and rental cars weren't honored. Officials of Afips said they would never hold another conference in Boston unless conditions changed.

— *Computerworld*, May 28, 1969.

Anaheim cannot hold a show that size. We won't go through that again.

— Robert C. Speaker, operations manager for NCC, June 1984

Too hot, too crowded, too many vendors, too many attendees. If you're mumbling these familiar complaints to yourself as you pick your way through the crowds and bright lights at this year's National Computer Conference, you're in good company. Afips, the organization that puts on the show, feels the same way.

The computer trade show industry is a big business now, growing at a pace that is far outstripping the growth of the trade show industry overall. And even with the number of smaller shows cropping up around the country,

NCC and Comdex, the industry's two largest expositions, claim to have vendors scrambling to get on the waiting lists for next year's shows.

With the number of computer shows approaching the saturation point, only the most well-established may continue to thrive. For small to medium-size vendors, the investment in attending a show can be risky. The cost of renting booth space, plane fare and building the booth are only the foundation in a pyramid of rising costs.

For all the talk every year about vendors staying away from NCC (and this year the talk is particularly pervasive), the crowds keep on coming. "We are only constrained by the amount of booth space available," says Robert C. Speaker, operations manager for NCC. After bringing the conference through a patchwork of cities the last few years, Afips — the American Federation of Information Processing Societies, Inc. — finally made the decision last year to limit future NCCs to the only two cities that can reasonably accommodate the show, Las Vegas and Chicago.

Even Las Vegas seems hardly big enough to hold this year's show. Conference organizers

IN DEPTH/TRADE SHOWS

had reserved a block of about 21,000 of the city's 51,000 hotel rooms, but with registration running ahead of previous shows, you might find yourself camping out in a tent in the desert or unwinding in an adult-entertainment hotel.

Las Vegas in July poses another problem: heat. Ironically, it was the heat at NCC Houston that led to this year's decision to hold the show in Las Vegas. Afips had originally planned to hold this year's show in Houston but received so many complaints about heat, humidity and general conditions there that the decision was made to change to Las Vegas. July was the only month Afips could get a booking. Speaker says Afips asked for an earlier date, but at that point it was too late.

Conference organizers have tried to make the best of the situation. Exhibition sites are limited to the Las Vegas Convention Center and the adjacent Las Vegas Hilton rather than spread out to other hotels. In addition, the number of exhibitors has been limited to about 3,800, according to conference chairman Russell K. Brown. Because of the restrictions, there will be a number of companies who never make it to NCC. There is a waiting list "in the 100s," according to Brown.

While the prospect of attending a major trade show in July when you'd rather be heading out to the mountains or the shore may not appeal to some, the date is not merely a result of poor planning. This NCC is not the first held in July; next year's show in Chicago is also set for this month. To avoid conflicting schedules of constituent member shows, the organizers of NCC are limited to the April-to-July time frame. Speaker sees some advantage to a July date. Afips wants to attract the "academic community, and a lot of the schools are in session earlier," he explains.

Every year, show organizers consider the option of breaking NCC into two smaller, regional shows; but there is no departure yet from the traditional one. Ironically, NCC started out as two separate shows, the Spring and the Fall Joint Computer Conference, held on the East and West coasts. Afips and its constituent societies also host smaller, specialized conferences, but they do not appear to have drained any of the overflow from NCC.

Comdex: NCC for dealers

While Afips was making preparations to host a near-record crowd of 33,000 for NCC '73 at New York's Coliseum, Sheldon Adelson, president of The Interface Group, Inc. in Needham, Mass., spent the weekend worrying whether his first show, Datacom Interface, would bring in enough registrations by Monday to allow the conference to be held. Monday brought good news in the mail, and today, The Interface Group's Comdex shows are the NCC of the computer dealer industry.

Although NCC still exceeds Comdex in total attendance figures, the last Comdex/Fall and Comdex/Spring were each ahead in the number of exhibiting companies and booth units sold, according to Linda Yogel, a spokeswoman for The Interface Group. NCC hosted 665 exhibit companies at its '83 show in Anaheim, Calif., and approximately 3,185 booth units were sold, according to Katherine Stormont, exhibit sales coordinator for NCC. Comdex/

Fall held 1,400 exhibit companies, with 5,700 booth units sold.

The numbers game aside, Comdex and NCC do not claim to compete directly. They are more like IBM and the old AT&T — two giant monopolies specializing in technology but competing for different markets. Comdex targets independent sales organizations, concentrating on micros. Management does not promote the show to users, which is NCC's audience. NCC and Comdex have grown together; their successes have not cut into each other's audience share.

The Interface Group hears the same complaints as Afips: "The show is too big." Or, "We miss the good old days." In response, Peter Young, public relations director/conference manager, says, "We all long for the friendly intimacy we had

back then. But we haven't grown in a vacuum. We've grown in response to an industry requirement."

The popularity of Comdex has led Interface to expand it to three domestic shows this year. "We're under pressure from industry to provide more space at the same time we're being bitched at for being too big," Young says.

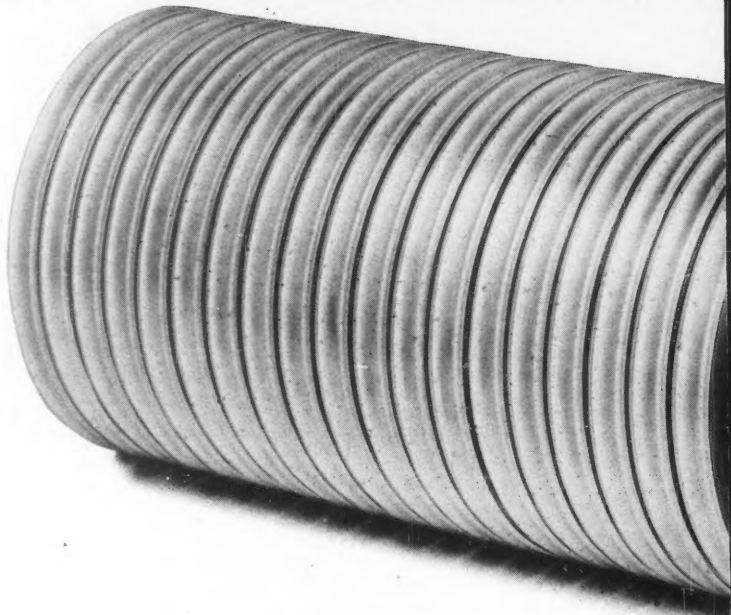
City limits

Comdex is also limited to a narrow choice of cities and dates. With a total attendance record of 83,000 at last fall's show and an estimated attendance of a little more than half that number at the spring show, Las Vegas has proved a good bet as a site for Comdex/Fall, and Comdex/Spring in Atlanta continues to be a success: The Los Angeles area is the site for Comdex/Winter.

Although The Interface Group takes what it calls a "systems approach" to the choice of city and date, the company's success in Las Vegas started as the result of a "good hunch." The first Comdex was held in Las Vegas in 1979 because "Shelly [Adelson] had a gut feeling it was the right place for the show," Young says. No research was done, but Adelson felt it would be a good city for the kind of person who attends Comdex: marketers who like the neon and entertainment. "Adelson guessed right," Young says. "The audience liked it."

The first Comdex was held at the MGM Grand Hotel. The second year the show moved to the Las Vegas Convention Center. The fact that Comdex had already grown too big for the MGM Grand Hotel was fortunate for The Interface Group and its

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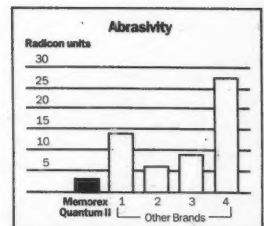
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IN-DEPTH/TRADE SHOWS

audience. A disastrous fire broke out at the MGM on the fourth day of the conference, and eight exhibitors and attendees staying at the hotel perished in the flames.

Although size is the biggest factor in choosing a location and date, The Interface Group works in a number of other variables. Because the company also owns a travel division, called GWV, it can offer a package including hotel reservations and airline tickets. Plane schedules (direct flight availability and connections), the number of first-class hotels and the city's nightlife are all factored into the choice of city. Even with this detailed approach, things do not always work out so well. The second Comdex/Spring was held in Atlantic City, N.J., which has an aging convention center. Brownouts and antiquated wiring were just a few of the

Competition among trade show promoters is heating up as new, smaller promoters scramble for their share of the trade show dollar. One way for promoters to get their foot in an established market is to join the trend toward more specialized shows.

problems at that show.

Even with its experience and clout, The Interface Group, like NCC, cannot always get the date it wants. The last Federal DP Expo was held at the Washington, D.C., Convention Center in April. The fact that April 17-19 was Easter week, Passover week and school vacation week didn't help attendance. A number of major cities simply don't have the facilities yet to hold a Comdex or NCC. The Interface Group would

"love to hold a show in Boston," Young says, "but it's impossible at this time."

Avoiding snowstorms and heat is not the only factor that goes into the timing of a show. Some vendors have complained that Comdex stages its shows too close in time to other shows they would like to attend: Softcon and the Consumer Electronics Show, for example. Linda Yogel denies this charge. The Interface Group's options on cities are booked

so far in advance the company could not use this kind of strategy even if it wanted to, she says. If anything, they would "book around" competitors' shows so as not to interfere with the Comdex audience. Newer shows might use this strategy since they are smaller and don't have to plan so far ahead.

Specialized shows

Competition among trade show promoters is heating up as new, smaller promoters scramble for their share of the trade show dollar. One way for promoters to get their foot in an established market is to join the trend toward more specialized shows. Software-only shows, such as Softcon and Software Expo, and communications industry shows like the International Communications Association (ICA), Telecommunications Association (TCA) and the Communication Networks Conference & Exposition are examples of shows targeted at a very specific audience.

While attendance at NCC and Comdex is still climbing, vendors geared to specific markets are finding the specialized shows a good place to narrow in on their target audience. The move toward specialization does not appear to be cutting into the audience share of the big shows. Most vendors are adding specialized shows to their list of big ones.

Established show promoters may even welcome the trend toward specialization if they can cash in on it themselves. Afips sponsors the Office Automation Conference, geared specifically to OA vendors. Afips plans more OA conferences in the future and is now working on Afips Asia and the World Conference on Education. Although the specialized shows are not always geared to the same audience as NCC, there is some overlap. In the future, Afips may benefit by draining off some of its NCC audience — which is too large — to its smaller conferences and still keep them with Afips.

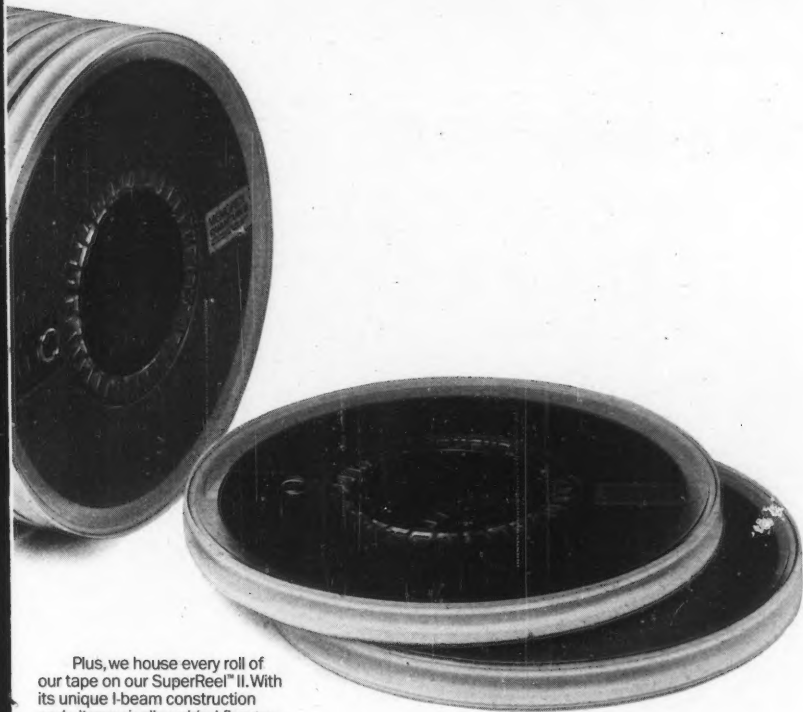
Watchful eye

The Interface Group, which also puts on a number of smaller shows, has not cashed in on the trend just yet. The company sent some of its people to "scout out" the first Softcon in New Orleans. Young admits, but "we're not in the business [of specialized shows] yet. We're keeping a watchful eye, but we're not worried."

In the software-only arena, the trend toward specific shows does not appear to be picking up much steam of late. Northeast Expositions, which originally planned to hold two Softcon conferences next year, recently decided to merge the shows into a single event for '85. The saturation level of computer shows and the desire of exhibitors for one solid, annual show were the reasons behind the move, according to a company spokesman.

On the other hand, Info/Software, held for the first time last month, drew more people than its organizer, The Cahners Exposition Group, had predicted. Cahners will schedule a second show next year. Vendors and users alike enjoy the calmer atmosphere of the software-only shows. But vendors continue to grumble about what they perceive as sparse attendance compared with the major shows.

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IN DEPTH/TRADE SHOWS

One trade show that has capitalized on the trend toward specialization in the communications field is the Communication Networks Conference & Exposition (CN), which is managed by CW Communications, Inc.'s Conference Management Group. The booming communications industry and the AT&T divestiture have helped give CN a tremendous boost in the last two years. "Trade-show Week" reported it the fastest growing show held in the first quarter of this year.

CN, which started in 1979, signed on IBM after its January show this year for the first time, and the show is becoming a regular with major vendors in the telecommunications field. William Leitch, CN's general manager, admits that "the element of good fortune" has played a role in the show's success: CN in January

In response to complaints that NCC attracts a lot of unqualified buyers, Speaker says, "Sure, we'd like to upgrade the audience." Afips tries to reach a high-quality audience through marketing, but it doesn't want to "put down the college kids" either.

was the first major show held after the AT&T divestiture. Originally started with more of a conference orientation, the New Orleans show in 1983 was the first year exhibit revenue exceeded program revenue.

Breaking down specialization into even more minute pieces, the Conference Management Group is moving into more specialized shows with its spinoff of CN, the Network Management & Technical Control Conference, which was held for the first

time this spring. Even with three other major specialized shows competing in the communications field — the Interface show, TCA and ICA — Leitch doesn't see much audience overlap. "The more voice-oriented go to ICA," he explains. "CN has more of a data orientation." Attendees must also be a member of ICA and TCA to get into those conference sessions, although any company can exhibit there.

If there's one thing exhibitors and

show management agree upon, it's the importance of attracting a quality audience. Attendance figures mean little to exhibiting vendors if no one or "just looking" attendees come by their booths. "There's no such thing as show attendance," Young maintains. "Most exhibitors could care less about the show's attendance figures; they just care about who's coming to their booth." A show may boast record-breaking attendance, and yet one vendor may complain that nobody came by his booth, while the next exhibitor is overwhelmed by the traffic at his area. "There are 500 little shows going on within one show," Young says, and some of those little shows are more successful than others.

The solution to this problem is to qualify the audience. Afips and Comdex make concerted efforts through marketing to reach the qualified buyers they want to attend their shows.

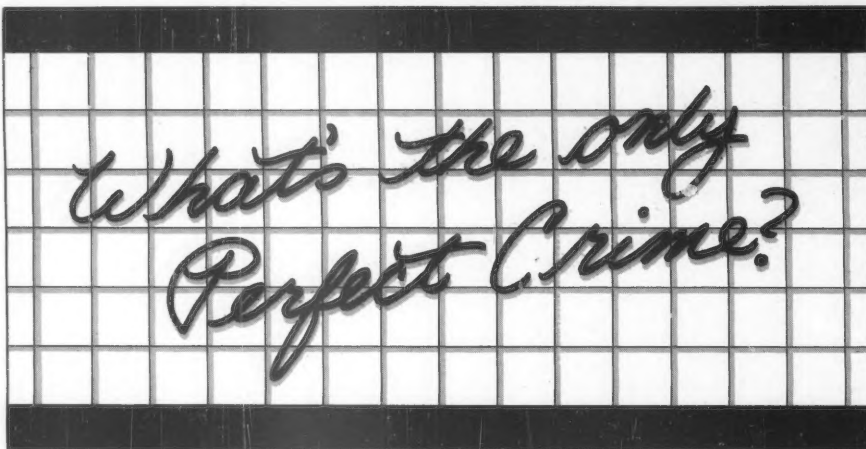
The NCC audience is the user-buyer. In response to complaints that NCC attracts a lot of unqualified buyers, Robert Speaker says, "Sure, we'd like to upgrade the audience." Afips tries to reach a high-quality audience through marketing efforts, but it doesn't want to "put down the college kids" either. NCC would like to provide both, Speaker says. "We want to please the exhibitors who want to attract customers and the college kids who are our future buyers. [They're the ones] who will go on to work for companies and make recommendations on what equipment to buy."

Technical to neophyte

Afips wants to attract a broad spectrum of people to NCC; its goal is "to bring together end users with management, the technical guy with the neophyte." The remoteness of Las Vegas, which is expensive to travel to and hardly a mecca for academic types, should have an interesting impact on the makeup of NCC's audience this year. The show is usually held in large metropolitan areas. In fact, some companies are already starting to grumble about the number of shows now being held in Las Vegas. The cost of plane fare alone from the East Coast or Southeast limits the number of conferences that companies can afford to attend.

The Interface Group targets its promotion for Comdex to computer dealers and resellers. Management won't "kick out end users," Young says, but it won't waste time or money promoting to them. Holding Comdex in a city like Las Vegas is a great deterrent to end users, though not the primary reason for holding a show in the desert. Big metropolitan areas attract a lot of end users and students on extended lunch hours. Young tells a story about a troop of 1,000 Boy Scouts on an extended lunch hour filing by the booths of one industry show.

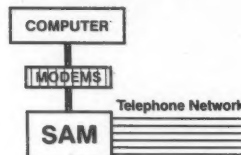
The Interface Group also charges a \$25 admission price for the shows to discourage those who aren't serious buyers. "This acts as a screen," Young explains. And for those end users who are discouraged from attending Comdex, The Interface Group also puts on a number of smaller shows to reach this audience, including the Computer Showcase Expos and the Byte Computer Shows, cosponsored by *Byte* magazine. The company also produces the



IT'S WHEN NO ONE KNOWS THERE'S BEEN ONE.

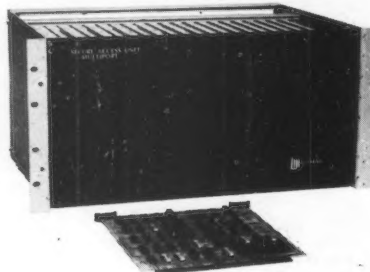
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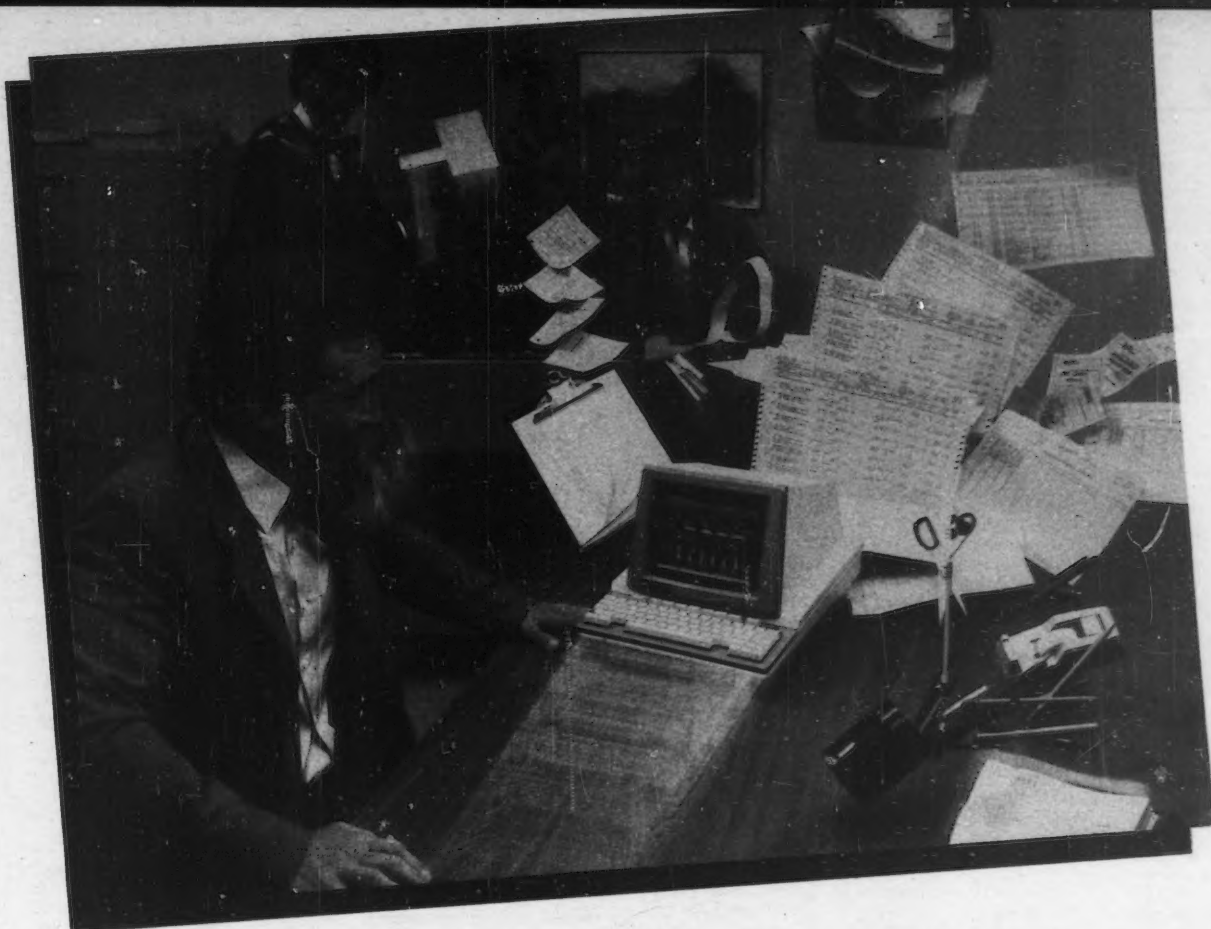
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IN DEPTH/TRADE SHOWS

To show or not to show

When going over the yearly budget to determine which shows a vendor should attend, one word keeps coming to mind: expensive. While big companies like IBM and AT&T can make the decision to attend a trade show almost automatically, small to medium-size companies must carefully weigh the potential benefits against the costs.

The price of booth space alone can be prohibitive. Comdex, the most expensive show in the industry, charges \$23.50 per square foot; the typical 10 sq-ft booth unit is priced at \$2,350. NCC charges \$17 to \$19 per square foot, with an average-size booth of 400 to 600 square feet priced at \$7,200, contingent on placement. Other expenses, such as hotel rooms, the cost of building the booth, transporting the people and shipping the booth can add up to a pretty expensive package.

The expanding number of industry trade shows gives vendors the opportunity to select a variety of different options. While NCC is still a "must attend" show for most companies, every year the subject of going to NCC stirs up increased ambivalence among vendors.

McCormack & Dodge Corp. (M&D), the Natick, Mass.-based software firm, is at NCC once again this year, but the company is questioning its plan to attend in the future. "We questioned it last year, too," says Ellen Ferry, exhibit coordinator for M&D. The general feeling seems to be that NCC is not always a good investment, but companies are afraid not to go. The "how would it look to the competitors and users" feeling runs deep among vendors. And a company's absence at NCC might spark rumors that a firm could not afford to exhibit there.

Ferry says NCC is too big and too expensive. M&D is paying \$12,000 for booth space alone this year, and "we're only getting a 20-ft by 20-ft space," she explains. Ferry likes the trend toward specialized shows. It segregates the different markets and qualifies the audience, so you only get the people you really want. M&D does more business at a show like



Worth the price of admission?

Software Expo than a general show like NCC. The company also exhibits at Info/Software, Advanced Manufacturing Systems and PC Expo.

Buildup to sales

Vendors exhibit at trade shows for a variety of reasons, and unlike salesmen working at a store, they are not always there to sell merchandise. Trade shows geared primarily to low-ticket items such as personal computers may provide sell-on-the-spot opportunities. But M&D goes to conferences mainly for lead generation and to get its name across. The company has a long sales cycle and does not really sell on the floor. While the company makes an effort to time new products to coincide with trade shows, Ferry says it doesn't always work out.

One of the chief advantages of exhibiting at a trade show is the exposure it can provide, and Ferry sees differences in the delivery of services promised by show management. Included in the high price vendors pay to exhibit, show management is generally expected to provide certain advertising services for the company: Direct mail, brochures and invitations may fall into this category.

Sometimes management doesn't come through, Ferry says, and M&D winds up doing its own mailings at great cost to the company. While Ferry would not single out a specific show, she sees this as a problem across the board, ranging from small promoters who may not have the budget to the big show promoters.

Reaching target audience

For Ztel, Inc., a small venture capital startup in the communications field, the exposure a trade show can bring is particularly important. The Wilmington, Mass., company is coming out with a fourth-generation

voice and data PBX, and its target audience at trade shows is the telecommunications manager.

Specialized shows are the place to go for Ztel, according to Cathy Simon, manager of advertising and sales promotion. Ztel goes to ICA and will also exhibit at TCA and the Communications Managers Association this year. The company is looking into some office automation shows for the future.

Ztel won't be going to NCC this year or next year. "Why go to a show with 80,000 people where no one has time to talk to anyone when you can go to a good quality, specialized show?" Simon asked.

Besides the advantage of reaching a specific audience, specialized shows sometimes charge less for booth space. Ztel paid \$13 per square foot for its 40-ft by 60-ft booth at this year's ICA show, and the price for next year's show remains the same. However, another communications industry show, Communication Networks, charges \$19 per square foot, with a standard 10-ft booth unit going for \$1,900.

With its products priced in the half-million-dollar range, Ztel hardly considers shows an opportunity to sell on the spot. Like M&D, Ztel exhibits to generate sales leads and meet potential clients. "Shows are a 'flag' for some companies," says Bob Beach, public relations manager at Ztel. "They're a good place for companies to get together and check out the competition."

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IN DEPTH/TRADE SHOWS

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Booth selection

Even if exhibitors get the quality audience they want, they need to make sure that quality audience sees their booths. Flashy colors, dancing girls and giveaways may all lure attendees, but if the booth is located off the main convention hall or stuck in the farthest left-hand corner, those dancing girls are going to be hard to find.

The process of booth assignments at Comdex evokes the excitement of a lottery drawing. A representative of one major vendor was fired when he overslept after a night of party-going and missed the drawing of his assignment number at Comdex.

Because booth size and price are standard at both NCC and Comdex, the selection process is critical to vendors. The number of times a company has exhibited and a strict adherence to the show management company's rules form the core of the selection process.

The Interface Group uses what it calls the assignment order (AO) procedure. The AO procedure is based on a numerical rating system for each show. Exhibitors who have participated in a series of shows the longest are given the highest priority. Priority is also given to those who sign up for the next year's show during the current one and who have honored the payment schedules and all contractual agreements.

AO numbers are generally assigned about two weeks before the show. Vendors select their space by going to the AO room during the show at a preassigned time. The AO system is very tightly run, and the forgetful exhibitor can get in a lot of trouble if the procedure is not carefully followed.

For example, a vendor may select an exhibit space in the AO process but forget to sign or submit the contract during the AO group. This lack of attention to detail results in the loss of exhibit space selected, and subsequent AO priority may also be forfeited. The system was designed to keep the selection process "free of politicking," but it also places a great amount of pressure for vendors to sign on for next year (if they want a good space) while they may not have had time to decide if this year's show was worthwhile.

Priority points

NCC uses a similar system for determining booth availability. Each vendor is given a certain number of points for how many years it has exhibited at NCC and the size of its booth. The process

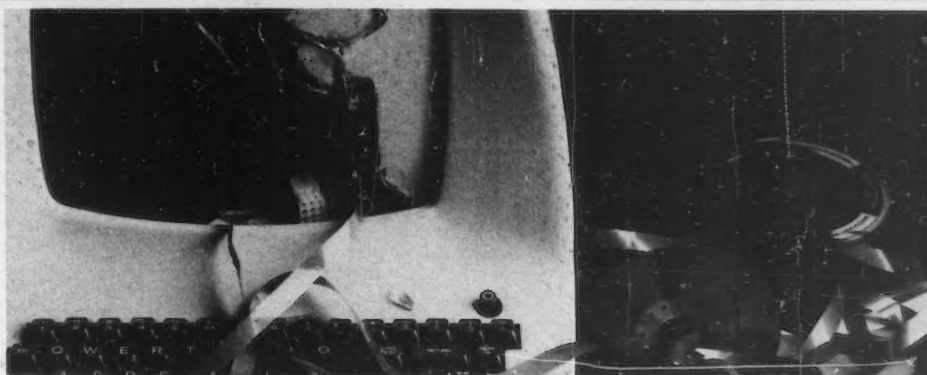
gives small companies who have exhibited for a number of years an advantage over a big company that might be a first-time exhibitor. A group of exhibitors — the Exhibitor's Advisory Committee — is in charge of the process. Afips has no say in the process.

Once an exhibitor determines his booth size and location for the next show, he'll probably want to start thinking about the most effective means for attracting

attendees to his booth. At some shows, almost anything goes.

NCC discourages anything "too fancy or flashy," says exhibit coordinator Katherine Stormont. "We like to think of ourselves as a conservative, professional show, concentrating more on education than entertainment." Afips asks vendors to clear anything with too much of a theatrical aspect with the organization before the show. Exhibitors who

Afips asks exhibitors to clear any display ideas with too much of a theatrical aspect through the organization before the show. Exhibitors who wanted to bring in live animals as part of their act have been rejected more than once.



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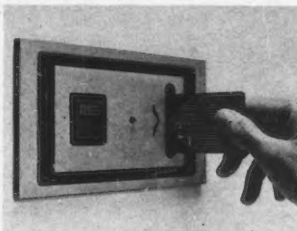
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IN DEPTH/TRADE SHOWS

wanted to bring in live animals as part of their act have been rejected more than once.

Scantily clad models are also not encouraged. But to those who recall the hot pants in Houston two years ago, Afips' definition of scantily clad may seem to be painted with a broad stroke.

The Interface Group's restrictions for Comdex are a bit looser than those for NCC — probably in keeping with its audience of dealers who may like a little more flash. Apart from the traditional height restrictions and space confinements determined by the fire marshal's office, the company "would not dissuade" any exhibitor from its own "unique strategy," spokeswoman Linda Yogel says.

At last year's Comdex/Fall, one exhibitor used an aerobic dancer

Apart from the cost of renting space, sessions can be an inexpensive way for show management to attract attendees and a good vehicle for session leaders to gain publicity for their companies.

who went through her motions to loud music on the third tier of the exhibit booth. Because of the height, she could be seen throughout the show floor. Yogel is personally not aware of Interface turning down an exhibitor for suggesting anything too garish; the only request not granted was to one company that wanted to bring in a "very large live animal."

Educating the audience

While trade shows in recent years have become a hothouse to show off

new products, a quieter side exists. NCC bills itself as a conference, after all, and in quiet auditoriums and rooms away from the bustle of the show floor, attendees listen to sessions on the latest technologies and trends. Sessions and exhibits run concurrently at most shows, giving attendees their own choice of how to spend their time.

Afips' Robert Speaker says there have been no complaints about the mix of sessions and exhibits at NCC. All run concurrently with the excep-

tion of the first session, the keynote address. Exhibits open when the keynote is complete or about to be completed.

The Interface Group also receives few complaints about the mix of sessions, according to Young. The number of sessions is determined by the percentage of registrants vs. exhibit-floor-only attendees. The large percentage of exhibitors at Comdex/Fall restricts meeting room availability that may be sold for exhibit space.

The Interface show is a more sensitive issue for the company because of the high percentage of sessions. In response to vendors' complaints at last fall's Interface that they were losing potential customers to the sessions, next year's Interface will experiment with what Young calls "front-loading." The first day will feature a heavy conference schedule, and the exhibit floor will not be open. This is the first time the show's promoters have tried it this way. "We'll see if it's a better way," Young says.

William Leitch, general manager of the Communication Networks Conference & Exposition, calls the concurrent timing of sessions and exhibits a "standard exhibitor gripe." Leitch says CN solved this problem by putting a "window on the program." From 11 a.m. to 2 p.m., attendees receive a complimentary lunch, and no sessions are held. Attendees are free to eat and roam the exhibit hall.

Small price to pay

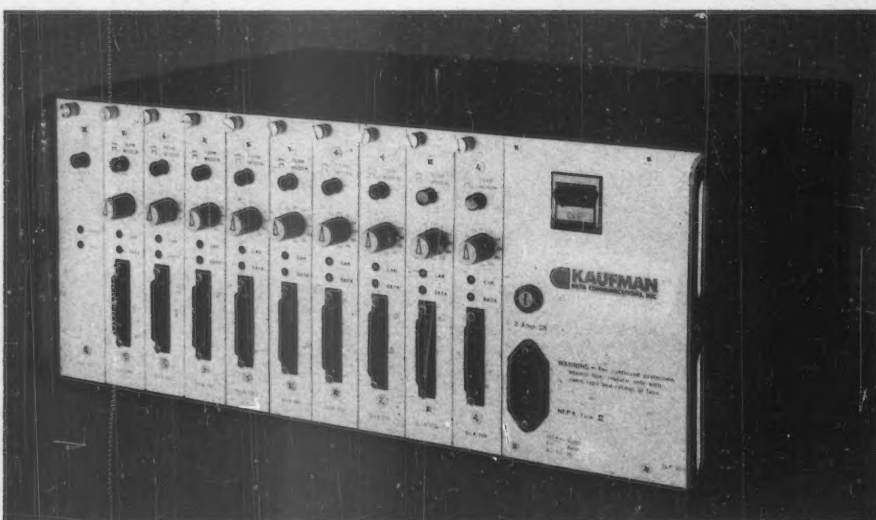
Apart from the cost of renting space, sessions can be an inexpensive way for show management to attract attendees and a good vehicle for session leaders to gain publicity for their companies. NCC pays the expenses of those who lead its Professional Development Seminars, but the other session leaders receive no reimbursement. Keynoters are offered the cost of their expenses, but Speaker can't recall Afips ever actually paying expenses. "They usually don't want it," he says.

Keynote speakers and session leaders at The Interface Group's shows also typically don't get paid. "More than 90% don't get a bloody nickel," Young says. Session leaders generally come at their own or their company's expense. And less than 10% get plane fare or a complimentary hotel room.

The Interface Group has paid only four honorariums to keynoters in six years — all political leaders who received \$1,000 each. Young echoes the general feeling that it is considered an honor to keynote, bringing "rewards that don't relate directly to money."

The company has looked at the fees commanded by famous people and decided it's not worth it. Speakers such as Alvin Toffler charge \$15,000 plus expenses. "We choose not to draw our keynoters from this pool," Young commented. "We have a noncelebrity strategy and have done well with it."

There is little space for bulletin boards or family pictures on the walls of The Interface Group's first-floor Needham offices. Nearly every square inch is taken up by layout drawings of the floor plans for future shows. If you're the kind of person who enjoys trade shows and likes to plan ahead, consider this: The Interface Group has options on cities past the year 2,000.



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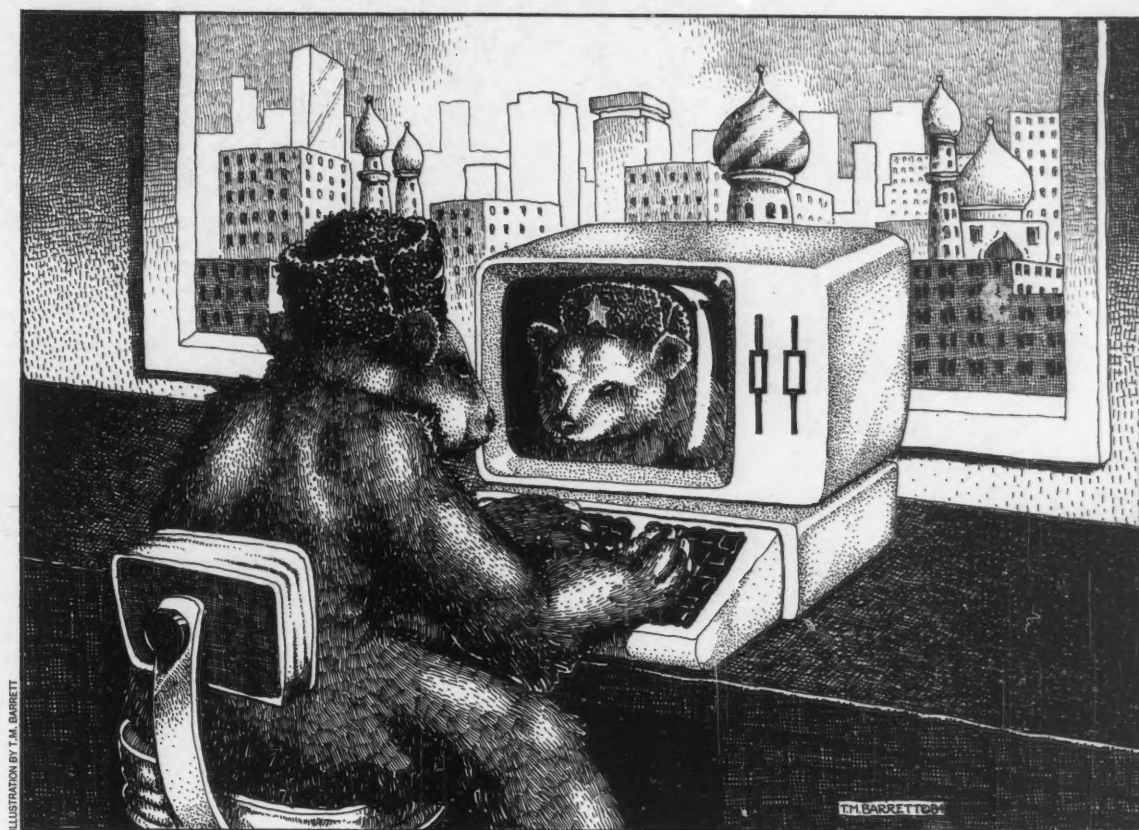


ILLUSTRATION BY T.M. BARRETT

Communism vs. the computer

Can the USSR survive the information age?

By Rex Malik

The hardware and software gap between East and West is about 10 to 12 years — somewhat less in robotics, considerably more in office automation. The Soviet bloc follows, it does not lead; the reasons are ideological and structural.

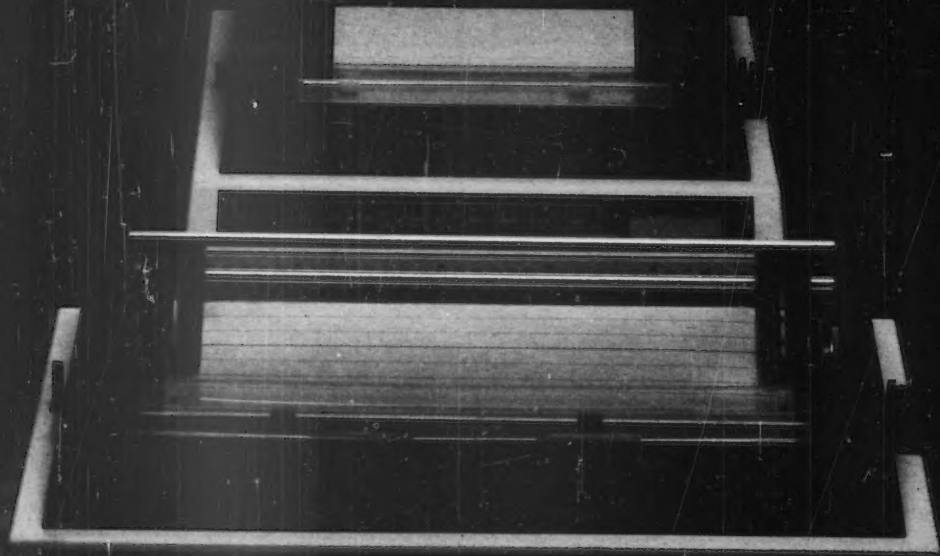
The arrival of inexpensive digital information technology poses a fundamental challenge to the survival of the Soviet system. The USSR and its associated countries cannot survive the large-scale introduction of information technology in any meaningful way and be recognizably the same system that has evolved, in the case of the USSR, over 70 years.

The main reason is this: The infrastructure necessary for the USSR to reap the benefits is absent and cannot be created without a massive administrative restructuring, which would be ideologically and politically more than difficult.

In a recent broadcast from Moscow, the Soviet commentator Boris Belitsky said that the "fifth-generation" computers the Soviet Union is setting out to create "embody the most valuable expertise built up by the computer industries of many countries, which was carefully and critically reviewed by the computer designers of the socialist countries [italics mine]." Once more, the Soviet Union is setting out to copy, to follow in a track set by others.

On March 29, the Soviets announced that a

(This article was adapted from an essay in the May issue of *Intermedia*, the journal of London's International Institute of Communications.)



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IN DEPTH/USSR IN THE INFORMATION AGE

"centralized system of automated access to foreign computer networks and data banks has gone into service in Moscow." Note the use of the word "centralized."

On Soviet television a week later, the chairman of the Siberian Department of the USSR Academy of Sciences criticized the incompatibility of two systems in different parts of the Soviet Union, both built at about the same time to do similar tasks. One would expect centralized planning to eliminate incompatibility.

Within the last year, senior party members and academicians have made unusual public statements reflecting their recognition that computing brings change:

■ Electronics are changing the nature of labor.

■ It is an urgent socioeconomic and important political task to intro-

duce electronic equipment and microprocessors into the national economy.

■ The use of computer technology could eventually release 50% of the productive work force and increase production by 2½ times.

■ Most of the USSR's population should acquire skills in handling computer technology.

What is not at issue here is the eventual capability of the Soviet bloc to produce — if it so chooses — the right and appropriate technology, although its hardware and software are likely to remain at least a decade behind that offered by the West. The gap between East and West is about 10 to 12 years — somewhat less in robotics, considerably more in office automation.

The Soviet bloc follows; it does not lead, and the reasons for its lags

are ideological and structural.

Why should the challenge take different forms in the Soviet bloc than elsewhere? What is inherent in the technology that poses a threat to the continuance of the Marxist ideological state system set up by Lenin and his inheritors?

Western European ascendancy was the product of two sets of forces, one of which gave rise to the other. The first was an attitude of mind, a product of the evolution of religion, philosophy, climate and language, which created a framework in which change became possible. The second was its product, the industrial revolution.

We are now witnessing the passing of that order in its second sense. It is the first set of qualities, however, that is likely to ensure that if anyone can pass through in relative-

ly good order, it is the nations of Western Europe and their descendants and inheritors. For the cast of mind that Europe's long evolutionary chain produced is essentially adaptive. Even so, these are challenging times.

The Soviet bloc, as presently constituted, cannot manage this transition — at least, not peacefully. And if not peacefully? A repeat of the social convulsions of 1848 is still possible, but whereas Western Europe could survive that, the Soviet bloc probably could not. The challenge that faces the Soviet bloc is quite fundamental, and that challenge is caused by information technology, its requirements, its applications and what it sets in train. The growth of information technology is

The growth of information technology is inimical to the continuation of the industrial society. That is the problem. And the Soviet system has the industrial society at its heart.

inimical to the continuation of the industrial society. That is the problem. And the Soviet system has the industrial society at its heart.

We are talking here of Soviet-style communism. We are not referring to the USSR alone, but to the European bloc of the USSR, Bulgaria, Czechoslovakia, Hungary, Poland, Romania and East Germany. In many matters, these countries are best understood as one bloc; and that is especially true with the development of information technology. The linking structure is the Council for Mutual Economic Assistance, known as Comecon. Strict Soviet-style communism, as described here, centers on the USSR (notably Russia) and the satellite countries in Eastern Europe.

To say that the bloc must be looked at as a whole is not to imply that it is a monolith. To a degree, the different countries evince different attitudes and behavior to the West and to information technology. In relative terms, the USSR is taking a stricter, more orthodox line, whereas some of the satellites are being more adventurous and innovative. This is not happening with the encouragement of Moscow, only with its grudging acquiescence.

In Bulgaria and Hungary, especially, a new generation of management is taking risks with a series of economic reforms. In Hungary, planning is indicative, not prescriptive. Managers are increasingly accepting the opportunities for decentralization. Whereas in Hungary the managers tend to act independently, albeit with the tacit support of the party, in East Germany the management and party apparatchiks tend to favor collaboration. The result is progress, if somewhat slow. In contrast, the USSR moves hardly at all.

Before we go any further, let me make my obeisance to the year of George Orwell, 1984. It is appropriate that one does, for computerized information technology is seen by many in the West as an Orwellian technology. They stress the power that it can give its operators should they choose to apply it to the

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IN DEPTH/USSR IN THE INFORMATION AGE

purposes of social control — and the ability it can give the rulers to maintain surveillance of the ruled at a more detailed level than previously possible — and end by substituting "will" for "can."

It does not follow that repression and social control cannot work in mass societies without computer power. The USSR, among others, managed quite effectively in that department long before the first computer was brought into action. True, it was not always thorough and effective, but capriciousness can be just as effective an instrument of terror and work just as successfully if not as finely. And sometimes it can be cheaper. Computers have played little part in getting the reputed three million people into Soviet labor camps.

A scenario is possible in which computing in the Soviet bloc is used primarily as an instrument of control, in the sense of police control. But if this is all that it does, the system has essentially conceded the economic race. And this it cannot do. The bloc is a political entity whose ideological justification is economic, and competitively so. To give up the race would be unthinkable.

It is important to understand that the challenge now facing the Soviet bloc is not an immediately dramatic one; forget Hollywood and *High Noon*. The decline instead will be gradual; the processes by which it occurs are akin to erosion. And this in turn could lead to political steps that could have unfortunate consequences for the Soviet bloc and for

We are on track for a highly dangerous situation. The way we have chosen to go presents the Soviet leviathan with some very stark choices which, however it wriggles, it will eventually have to make.

ourselves. Given that we seem to be able to steer through the escalation of nuclear weapons and still remain at peace, one can see a situation arising in which the Soviet system is relegated to the second division of economic power, a supplier of raw materials and not much else. Whatever one may believe about the USSR, that is not a postulate that any of its people (let alone their leaders) would be willing to accept.

Yet it remains clear that information technology will bite deepest and have its most profound effects in "free" societies, which have a tradition of a relatively unfettered freedom of inquiry, a freedom from direction as to where intellectual curiosity may take you and the individual freedom to acquire the skills that individuals themselves consider important. It will flourish best in societies in which, as John Milton put it more than three centuries ago, there is "an open market of ideas."

Broad range

Information technology? That should be read as covering digital electronics and ranges from computing in all forms and applications to cable and satellite technology; from

advances in I/O devices and procedures, which will make even cheaper electronics possible, to developments in high-speed, very large-scale integration. Also included: advances in software, development of abstract theories of mathematics to give ourselves a better grip on reality and research in practical applications of cognitive psychology and systems development. This last gives us the likelihood of a technology with a "human face," one that can be seriously applied to the care of the sick, the disturbed and the elderly, as well as giving powerful data tool combinations to expand the performance of the rest of us.

There may be, even in the Organization for Economic Cooperation and Development (OECD), a mix of attitudes to the application of the technology. But we have enough experience (and evidence) of behavior, even in its sometimes still surprising primitive state, to have some indications of the main thrusts. They can be briefly summarized. Those people who have or can obtain access to the technology want it to do the hard, the dull, the boring, the routine work, while extending their own control and providing greater per-

sonal interest. Properly applied and used, it is an immense amplifier of human capability. The people — at whatever level — want this without any loss of status, income or career prospects.

The way information technology is now developing is inimical to the continuation of the structure of the Soviet bloc (and there is little possibility of turning back) because the technology is not neutral. The consequences may seem surprising. We are on track for a highly dangerous situation. The way we have chosen to go presents the Soviet leviathan with some very stark choices which, however it wriggles, it will eventually have to make.

In a market-based environment, where investment and other business decisions are made from the bottom up (in its broadest sense) and the "people" may not initiate but still have the power of rejection, one can say that, however imperfect the system, it has enough plasticity to reshape itself as change occurs. A key factor here is the extent to which the society generates new wealth and provides mechanisms to distribute it.

No such adaptation is possible in a top-down economy without the consent of those at the top. Now there are good reasons why this support will be difficult to obtain, why it would not be forthcoming, unless the Soviet bloc were to face the sort of convulsion experienced by China after the cultural revolution, the death of Mao Tse-tung and the rise of Deng Xiaoping. And even there, it should



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be observed, change is slow and patchy.

The choice is fundamental: Reject or adapt and cease to be Marxist-Leninist, Soviet-style. If the choice is the former, face the possible erosion of Comecon's economic position; though its resources will still continue to grow, they will not grow at a rate commensurate to that of the politically competitive industrialized societies. The effect of that, in turn, may well be to tip irrevocably the balance abroad against communism, Soviet-style, as a model for others to follow. It will be increasingly seen as an interesting experiment, if a costly one, but one that has failed: in the long scheme of things a very expensive and irrelevant sidetrack.

The core notion at the heart of communism is that it will in the end provide a better life than that ulti-

mately offered by other systems. This notion can still be held to, though the system has to find more excuses why it has not happened yet. But, increasingly, this tenet will be seen to be a delusion. And the Soviet people might well find out, which they have not as yet been officially and willingly allowed to, that their advances, where comparable to those made by others, have been bought at a much higher price than those others have had to pay. The best that will be able to be said for communism, Soviet-style, will be that it is of no more validity and importance than the idea that the application of almost any skill to the solution of a problem is better than no skill at all.

Ironically, the Soviet system's large-scale dependence upon technological advances in Europe, the U.S.

and Japan means that there is a growing constituency that somehow or other has access to foreign material. Electronics engineers, software specialists, telecommunications professionals, process control engineers, chemists of almost all kinds — all must have access to this literature if they are to keep up (even if it has first to be translated, usually by official, centralized agencies).

Yet internal network and data base technology is still in its infancy. The routine inquiries made by academics and scientists in Europe and North America using packet-switched communications networks are not routine in the Soviet Union. Some networks do exist. The State Committee for Science and Technology operates Viniti for general technical data and Patent for patents. These systems seem to work moder-

ately well, if in a passive mode, and with understandably strict conditions of access (easy to arrange if you restrict the number of terminals). Another network, called Academet, is scheduled to become operational within the next year or so. But experience teaches us that the process of interconnecting research institutions and penetrating the research community is surprisingly difficult and has a long learning curve.

Within information technology, the digital computer lies at the core of the challenge. To consider what one can perhaps call, in a shorthand phrase, the case of "communism vs. the computer," we must briefly consider some crucial aspects of the societies being developed in the OECD countries in which computing is endemic and intrinsic, for they could no longer run without it.

There is no agreement in any detail about the changes that information technology is likely to bring about or make possible in society. For there are a number of schools of thought, and much of the writing is overlaid with special pleading not just about what might be or could be, but about what ought to be. Politics, philosophy and national viewpoints intrude (why should one expect anything different?). All that there is general agreement on is that information and its electronic handling are central to the structures and processes of the evolving societies in the West. And only those societies are in a position to pose the question: How do we get out of here?

The key words are information and electronic handling, and we need to disentangle them as much as possible. Let us now take our first push at considering information. I am not putting forward the proposition that information displaces the uses of energy and other machines, rather that it takes its place within the basic equation about what is required to make a modern society run. This can mean a major readjustment about the way one thinks about the economy at its most basic structural level.

It means not simply a major readjustment in the way we think, but also in the way we act. The evolution of work in the 20th century has been toward less and less human muscle power and more and more knowledge. That knowledge is based on transmittable information which, in turn, is based on data (which will have the same meaning and value to a task, irrespective of who is doing it, which is another principle of great power).

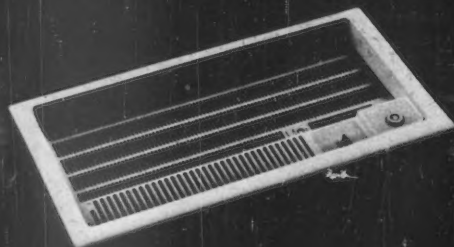
Where does the Soviet bloc stand on these trends? It is not surprising — it is part of my thesis — that no meaningful figures are accessible. However, we can make intelligent guesses, especially about the USSR. At the start of the 1980s, the USSR had a population about 20% larger than that of the U.S. and a gross national product less than half the size. Yet:

- The USSR employs roughly twice as many people as the U.S. in the manufacturing industry.

- In industrial manufacturing, more than half its employed labor force is engaged in unskilled or semi-skilled physical labor, as opposed to 10% to 20% (a figure that is steadily falling) in OECD countries.

- There were probably 15 times as many information workers providing financial, insurance and

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business services in the U.S. as in the Soviet Union.

■ When we look at the numbers of computers installed, the ratio of mainframe installations is probably on the order of between 15 and 20 to one in favor of the U.S. But this figure does not tell the whole story. The U.S. systems (and the same applies to other OECD countries), in terms of hardware power, are much, much larger and are usually applied differently. And, of course, because of developments in software and telecommunications, they are now different in kind.

■ When you come to minicomputers, the differences between OECD countries and the Soviet Union widen. They widen even more when you come to terminals; they are immense in word processors; and with microcomputers the differences are astronomical. We are looking currently at an installed base of 15 million to 20 million in OECD countries (and an annual growth rate of 30% a year) and not even 150,000 to 200,000 in the Soviet Union.

As a generality, we are looking at an operational technology difference between East and West of probably one order of magnitude.

If one accepts that there is a correlation between meaningful information meaningfully applied and the rate of growth and the rate of change (which, put this way, is a statement of the obvious), one can think of this as the critical indicator of the process that turns a society from an industrial society into an information society.

The problem that faces the Soviet bloc in trying to make this transition from an industrial society to an information society is that it faces an evolving structure of economic society essentially foreign to it. Central to the differences is the issue of information. Its existence, its validity, its objective measurement, who has access to it and how it is used all have a critical role to play in the development and transition process.

There is in the West an open marketplace of ideas, an ever-growing accretion of information, which ensures that each year there is substantially more data to be handled, more complexity to be unraveled and ever-increasing information entropy. Change, progress, whatever you care to call it, requires that this entropy be reduced. And digital information technology is our basic means of doing so, if not our only means. The computer relates to data as effective government relates to the reduction of social entropy. It is this that the people of the OECD countries have sensed lies within information technology, which does not, of course, mean that they always like the results.

Fortunately, there is seldom widespread objection to the manipulation of data and the creation of information and knowledge. This work is helped by the fact that almost all real data arises at the individual and enterprise level independently of government. As a result, the measurement of real performance is a routine activity conducted at many levels across society. This is not routine in the Soviet bloc.

One can construct a scale with two components. One would be the penetration of computing into administrative processes, both government and industry; the other would be the degree to which data and informa-

The Japanese consensus system, which keeps everyone who needs to know informed and seeks what one could call a democratic agreement about how to proceed, can put a high initial cost on the "information overhead." But it pays off.

tion are shared across society. Nowhere, of course, is it enough. However, the scale would demonstrate that the more the penetration of computing and the more the information is shared across society, the greater the level of growth and prosperity; the less, the worse.

It is no accident that were one to plot these two factors against stages of industrial development and the growth rate of competitive industries, the more the correlation would

be shown to exist. The USSR (where computer penetration at the level of operational enterprises is probably at its lowest of all major industrialized countries and information sharing is minimal) lies at one end of the scale. Japan, where the situation is the reverse, lies at the other.

The case of Japan is particularly interesting. It illustrates the additional power conferred by open access to information and appropriate social habit. The Japanese consensus

system, which keeps everyone who needs to know informed and seeks what one could call a democratic agreement about how to proceed, can put a high initial cost on the "information overhead." But it pays off.

It is worth reminding ourselves of the key differences between the two approaches. The Soviet bloc is founded on a fallacy. That fallacy is not necessarily the one that people in the West normally think it is: that the Soviet bloc tries to control the economy and that an economy cannot be controlled to the level that the Soviet bloc requires if it is also to grow and develop. Though no one has so far demonstrated a successful and rapidly growing controlled economy, one cannot rule it out. It may well be that in the long term, the digital principle makes it possible, though I suspect it does so only if economic affairs have

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been radically reduced in importance in the lives of the people.

No, the fallacy is not a matter of more planning. It is much deeper. It is the fact that planning is tied to a specific ideology. And more. Everything is linked to ideology, and the ideology is hostile to change. It proclaims the ultimate revolution while debarring and preventing the next day's evolution. It embraces grand gestures and is impatient with the small steps, the fuzzy groupings, that surround innovation.

The fallacy is this: The state is ideology written administratively, and one cannot officially change the administration without changing the ideology. The result is statism, ossification and an inability to respond at the pace that change would otherwise make necessary.

Three major strands in the Soviet

system conspire to make the transition to an information-based society a problem of horrendous complexity and magnitude:

1. The links between ideology and the administrative machinery. This strand is the most obvious of the three.

2. The links between ideology and people. Soviet careers depend largely on membership in the party and achievement within it, rather than on functional abilities (there are similarities with the conflict between "reds" and "experts" in China).

3. The linkage between ideology and data. The availability of information and communication flows are not sufficient to enable a 20th century industrial economy to be run effectively if the judgment of effectiveness is to be comparative performance with the rest of the

industrialized world. Each step the Soviet bloc takes is seemingly bought at a higher price than that paid by its competitors. The right information is seldom easily available. Yet effective and rapidly increasing information flows are a precondition for a transition to an information economy.

It is these three conditions which have made it more than difficult for the Soviet bloc to create an electronics industry that could compete effectively with those of the OECD countries; yet the creation of such an industry is a necessity if any transition is to be made.

The notion that a new, innovative company could appear almost out of nowhere and grow rapidly is not one found within the Soviet system. It is opposed not only by the administrative machinery, but also by the ideol-

ogy that sustains it.

Consider the case of the kind of small entrepreneurial company that has been so crucial to the development of microelectronics. Sinclair Research Ltd. is a good example. It could not have been predicted, let alone planned, that as a result of changes in technology, marketing, the public response to product and its own initiative, Sinclair would make four major model changes within four years and end up producing a system at four times the price, but with a 32-fold increase in raw power. That system also came with throw-in software which could not have been run on the first system; even if it could, it would have cost somewhere between 10 and 20 times the price of the initial raw system. We are talking of a price/performance improvement of some-

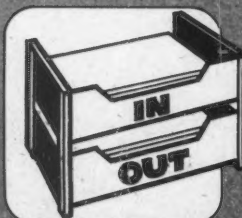
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thing well above 1,000%. This dynamic expansion is totally outside the Soviet planners' experience and intellectual framework.

In the real world of changing technology and changing product, the Soviet bloc's structural arrangements are such that they could be guaranteed to cause the maximum amount of delay, both bureaucratic and administrative. One of the Soviet bloc's most severe practical problems is how to subsume newish or evolving technologies within particular and specific structures of ministerial responsibility. The technology not only adds to power, it can also redistribute it; and thus, for some, diminish it. And the further up the ladder, the more difficult the technology becomes to introduce.

The problem with the Soviet bloc's information flows is quite simple. The system uses for its version of reality only those flows it claims exist, and these are built into the structure. Broadly speaking, what passes for information resources is the data that enterprises create as a result of their activities. This data may or may not be real in that it represents what the system wants and needs to know rather than representing behavior. It is then filtered and massaged by the party, mostly centrally, which puts its own glosses on the result and then makes it public — or not.

Much of the information the Soviet bloc creates is not public or widely accessible. In terms of a higher end, information is only publicized if it will help to shape society or mold it. A common pool accessible to all does not exist in any serious form except where it is operationally unimportant. The independent collection and analysis of data do occur, but in a restricted form with more often than not an even more restricted

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circulation. An information marketplace, a routine widespread exchange, whatever you may care to call it, does not officially exist in the sense that ideas and data are allowed to find their own level. They are not. There is prior censorship of almost everything generated through official channels.

The subordination of the people to the collective will, whether expressed on their behalf by one person or by many, has a long Soviet existence and an even longer Russian one. As a result, the people of the Soviet Union or most of the bloc have not been allowed individual access to information or the tools with which to handle it outside collective or monitored circumstances. The list of what the Soviet Union does not have or does not allow is long and extensive.

Street maps and other maps of meaningful scale covering the country, except for a few carefully chosen sites, are not available. Telephone directories are not routinely available, except in areas not accessible to foreigners. It was announced in 1983 that the city of Tbilisi has a computerized telephone directory with data on more than 140,000 subscribers and on more than 90,000 telephones in apartments. This system is an interesting route to follow, for it makes it easier to make a subscriber a nonsubscriber.

Telephones are not routinely available. The party has more than 18 million members, and at the end of 1982 there were little more than 26 million telephones. During that year, 1,250,000 had been added. We are talking of one telephone for every 10 or so people, which is a low penetration rate in comparison with the OECD countries, where penetration rates ranged from 60% to more than 90%.

The difference is critical. It is a common observation among commentators on telecommunications that there is a critical mass in telephone installations, thought to be around one phone to every three people. It is hard to be precise because it has much to do with the urban and agricultural mix both of people and phone installations. Once that critical mass has been passed, the government has immense difficulty in imposing its will, should enough of the population decide otherwise.

That will can be imposed by closing down interurban telecommunications while the system tries to restore what it considers to be order. But even then, unless it can seriously interrupt automatic dialing across the totality of the telecommunications system (as the Soviet Union was forced to do in 1983 with direct international dialing), its control is seriously impeded. It should be remembered that the interruption of internal automatic dialing has already happened in one country, by intent, not accident, during a time of crisis. The country was Poland, which has not yet gotten enough phones installed to have reached a critical mass. Viewed in this sense, the telephone is an instrument of democratic freedom.

More problems ahead

The Soviet people could hardly imagine a situation in which almost all books would be available for purchase or loan, as well as most records and films. This pluralism, of course, breeds knowledge and skills, which

in turn breed change, and that would never do. The notion that a society could have more than 100 competing computer publications available to all, most of which are independently produced, would terrify Soviet planners, yet that many publications are available in the UK market.

The Soviet Union is now faced with the personal computer and will have even more problems. The current five-year plan talks of a computer in every school by 1990. By contrast, the UK, for practical purposes, already had at least one computer in every secondary school by the end of 1983 and should have one in every school by the end of this year.

The system cries out for information technology; indeed, it could almost be said to be tailor-made for the benefits of information technology

— given, of course, that the models can be created and the algorithms written, that the necessary information flows take place and that the processing power is installed and running and deals with reality.

These assumptions might be upheld in OECD countries and, one might think, would be equally realistic in the Soviet bloc. There is, after all, a long tradition of control theory and mathematical model-building in the USSR. Russia, particularly, has a solid core of theoretical mathematicians of great skill and competence. If anyone should be able to arrive at answers, the Russians should.

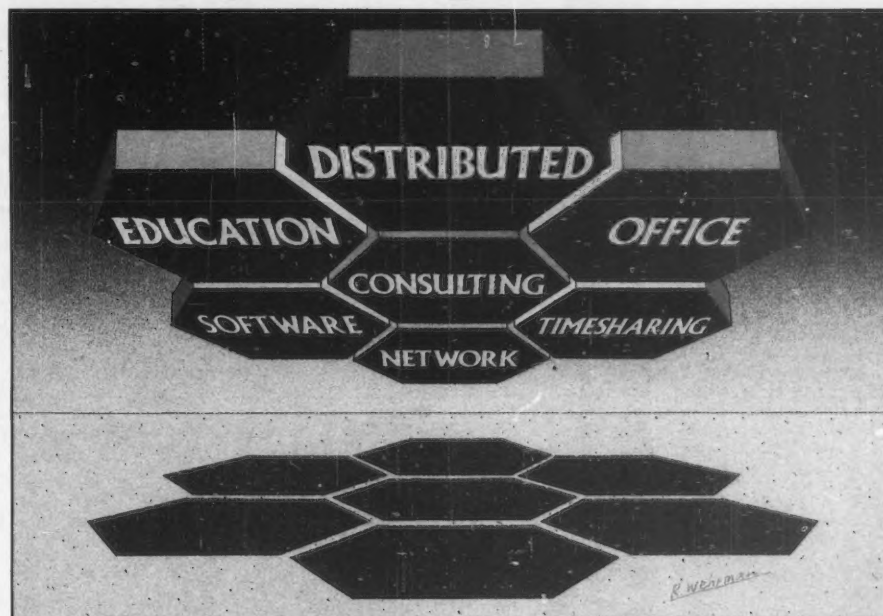
Wrong. The Soviet skills, which are undeniable, may be more of a problem than a solution. Ideology permeates data, too.

To sort out what to do, one has to have agreements about the ap-

proaches to be followed — and agreement right across the system. And then one has to have a period of stability in which to build whatever it may be and get it operational and embedded across the system. The Soviet bloc has not had that stability since computing began. It has been bedeviled for a quarter of a century by argument, much of it theoretical and covering almost the entire field, from almost pure mathematical theory to arguments about organizations of systems and hardware.

I am not arguing that information does not flow — far from it. Data does flow, lots of it. It is data aimed at the production of statistics. If statistics move you, then the Soviet bloc is a delight. But it is also a graveyard of data, a nightmare in which tables constantly pass before you, yet little data is available on what went

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wrong in a time scale for you to be able to affect it. Most of the time the data does not tell you what you actually wish to know and eschews comparisons across the board in any sort of time frame that would allow comparative progress to be measured. But the major characteristic of the data is that it is long dead. It is usually a record of the past, for the public, so carefully selected as to exclude what is not favorable.

Mixed blessing

Over the years, the Soviets' talent in control theory has had impact both there and elsewhere, particularly on approaches to solutions in associated fields. One thinks of Ivan Pavlov and his work on the conditioned reflex and Wassily Leontief's work on input-output tables (which came to fruition in the U.S.).

This emphasis on mathematics is a mixed blessing. It is undeniably strong. The Russian word for software is "mathematical means." The Soviets want mathematical algorithms, rather than the efficient handling of data. Incentives (salaries, promotion, power) are not geared to practical results, like higher sales or more productivity, but to the design of more and better models and theorems. Software — mathematical means — is often not a means to an end, but an end in itself. It echoes the Soviet problem that, for instance, there is often a shortage of spare parts because the factories are geared to total output, not customer satisfaction.

The Communists understood quite early that the system they were creating after 1917 demanded that statistics be collected on a national basis and that this required machine power. They were among the first large-scale users of that predecessor of the commercial computer, the tabulator. By 1929, the USSR was reported to be the third largest user of IBM machines after the U.S. and West Germany.

Now if you are to apply control sciences in the modern sense, then you must have the tools to do so, which means computers. The Soviet bloc had begun acquiring computing skills some time before; however, by the mid-1950s it was woefully behind. The performance differences between Soviet and Western systems were on the order of one to 100 or more.

The Soviets attempted to do something about this gap. They copied. The first real product of this policy appeared in the late 1960s. It was the Minsk series, a set of general-purpose computers for civil use which was copied from the NCR Corp. Elliot 803 which had been initially

designed by Iann Barron, now strategy director of Inmos, the British semiconductor manufacturer.

Today, 20 years later, the Soviet bloc is still largely dependent on foreign technology, the USSR especially so; most Comecon hardware is built in East Germany and Hungary. The most common mainframe series throughout the bloc is the Ryad, which is largely built in East Germany (the Germans understand quality control). Its design

— if one can call it that — began in the late 1960s, and it is an attempt to build look-alikes based on the IBM 360 series software architecture and instruction set, aiming for compatibility. It is copying without benefit of license payment or royalties. In the 1970s, the series was quietly upgraded to an IBM 370 look-alike, and no doubt copies of the 30 series and 4300 series will follow.

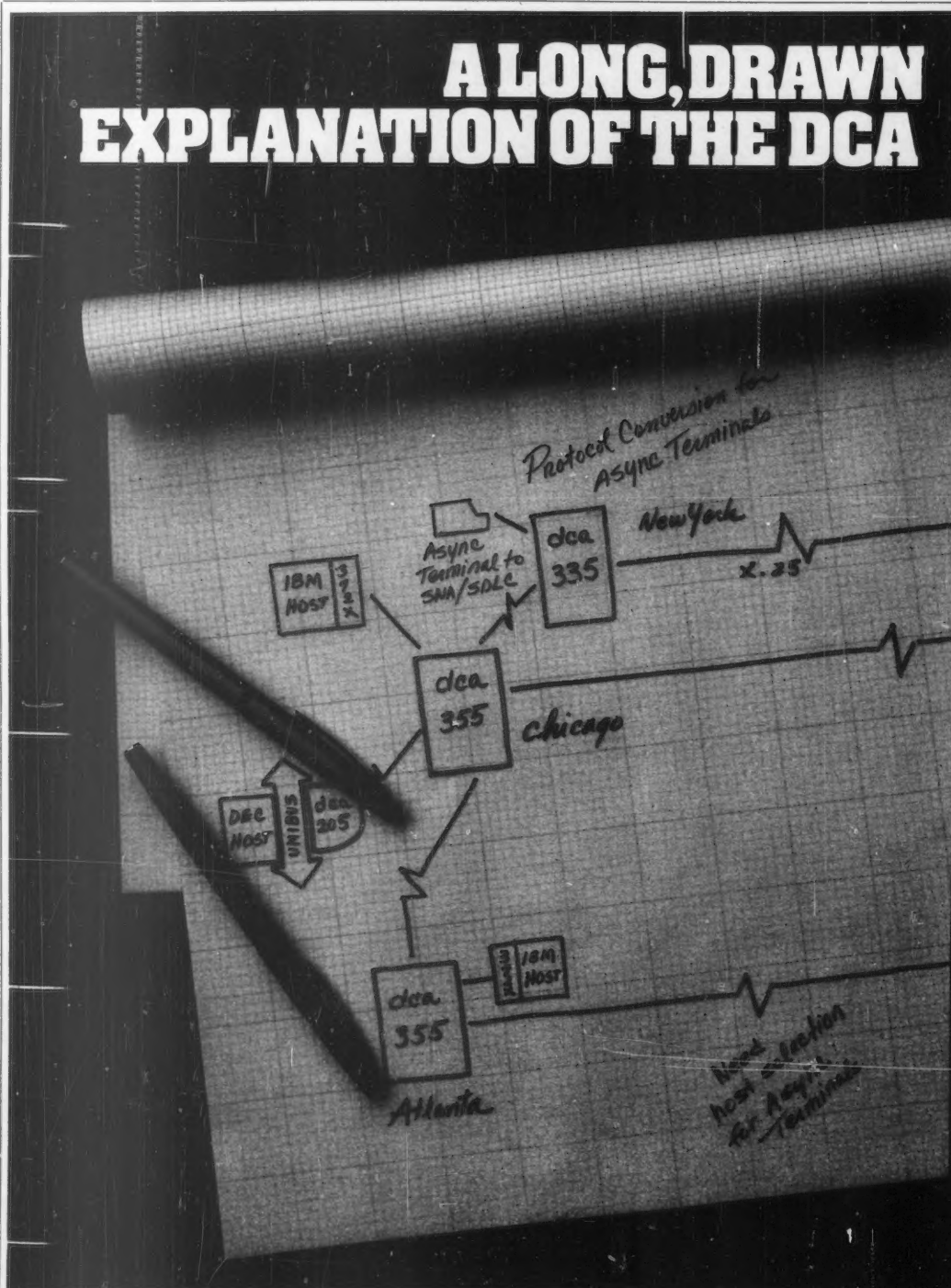
The system is still probably eight to 10 years behind

IBM. And IBM is not usually the world's leader of computing technology in practice. In the past and, I believe, still today, IBM has taken the view that it pays to be second — that a reliable, known and maintainable technology is preferable to a very advanced one. It is an acceptable view of the marketplace; after all, IBM has had well over 50% of the Western world's commercial mainframe market for a quarter of a century or more. IBM

technology often arrives on the marketplace three to five years behind its advanced competitors.

The agreement of any observers one talks to is that we are looking at systems, software, peripherals and applications which, even where comparable, are probably still 10 years behind the general level in the West. Much of the applications loads are still in the batch area (after-the-event administration). Communications-

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oriented systems are still a rarity.

There is another peril implicit in this approach. Planning processes of the kind practiced, and the dependence on comparable architectures and hence comparable technology to make those architectures work, means that the system is locked into a track that stays behind.

Computing breeds local autonomy in operational matters; such is the history

of its application in the West. The Soviet bloc's reluctance to grant such autonomy at local and regional enterprise levels has meant that the technology cannot be as meaningfully used.

The Soviet manager's problem is his inability to respond outside the confines of the planning mechanisms. He cannot react to technological change in any broad dimension. He must wait for approval, and that approval will come within the plan's

normal time frames. Yet although the managerial scope to create lateral links and respond to events is limited in theory, those links do exist in practice (how else would the system work?). All this breeds serious and practical problems for the political system.

Dilemma for Soviet elite

The Academy of Sciences of the USSR recently established a Department of Information Science, Computer

Technology and Automation. A vice-president of that academy, Academician Velikhov, could be heard on Moscow Radio in the summer of 1983 discussing the growth of the computing side of information technology and public access. What he had to say shows very clearly the dilemma that faces the Soviet elite. The excerpts that follow are taken from a transcription and translation made for the British Broadcasting Corp. World Reporter

Service. The interpolations in brackets are mine.

"Today," said Velikhov, "there are practically no reasons why every inhabitant of the Soviet Union should not have his own computer, one with a good memory and on which one can plan and calculate." [There is no mention of word processing, naturally, which would, I suspect, be covered by the same controls as exist with typewriters.]

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Computing breeds local autonomy in operational matters; such is the history of its application in the West. The Soviets' reluctance to grant such autonomy at local and regional enterprise levels has meant that the technology can't be used as meaningfully.

"I do not think that today it is a matter of being able to go into a shop and buy one—it would be a bit expensive, after all." [During last year's price discounting, which is still not over, the cheapest and smallest of the Sinclair machines was selling in the U.S. for less than £25.]

"Forecasts indicate that by the 1990s, computers will be just as common as a television or a car." [Which are not common at all. The Soviet Union has one television set to every three people and claims to have one car (private) to every 27 people. By comparison, both the UK and the U.S. have one TV set to every two people and considerably higher car ratios.]

"It is another question whether they will be in personal use, for on the whole, different countries go different ways. France, for instance, is basically taking the path of public use." [This claim is not just disingenuous, but carries misrepresentation to extreme limits. What the French are doing is making public data bases (notably the telephone directory) accessible over videotex systems. They are also consciously, clearly and actively encouraging the development of home computers for private use.]

"I think that we are to a considerable degree taking the path of the public use of these computers. They will, however, be at the disposal of all. . . . There will be computers in shops, collective farms, factories, in the transport system and at the disposal of economists." [Privacy is not encouraged.]

"As to going into every flat, this must be given some thought. After all, it is very important that there should be a need for one in every

IN DEPTH/USSR IN THE INFORMATION AGE

flat." [Nowhere in the broadcast is the top-down nature of the social system better caught.]

"In a flat, I think it should be something on the lines of a telephone, and it basically should be a system through which one can get information, information you need like booking tickets, weather forecasts, inquiries and so forth." [The questioner may not have realized it, but Velikhov has changed the nature of his response; he has caught up with videotex as it was first envisaged in the late 1960s, a system in which what already existed on paper was merely transferred to electronics.]

"Data from libraries and inquiry centers is a very important aspect. Such a system should be set up. [As to whether] it will be needed in every home, well, it must be understood

A society that copies cannot have control. The main Soviet microprocessor chips are based on the standard Intel and Motorola designs. The pace of technological change is not under Soviet control, even though the pace of its introduction may temporarily be.

that not many people work at home, but of course such a system will be needed for those who do work at home. . . . One could say also that the situation in our country with regard to information is by no means as good as it might seem." [He is right. He could be referring to the control of access to information, where it can be an offense to access and take away information in some libraries, though the information itself is

based on translations of works publicly available in the West.]

"And now a revolution, the transition to mass service, is taking place in it, to mass introduction. Technology makes it possible to do it. We have on the one hand to prepare society, to understand its needs and to forecast them somehow, and on the other hand, we have a different situation. It is not the market that is in control; we have planned control."

[Velikhov either deludes himself or is trying to delude his listeners. The Soviet Union does not have control. A society that copies cannot have control. The main Soviet microprocessor chips are based on the standard Intel and Motorola designs, and they are what will fuel any revolution that might occur in the Soviet Union. So even at this level, the pace of technological change is not under Soviet control even though, of course, the pace of its introduction may temporarily be.]

It is obvious that people cannot run an information-based economy unless they live in an information-rich environment in which the data that exists and the information into which it is turned can be objectively tested against reality. There has to be systemwide interaction. Currently, that interaction takes place only between managers up and down the line and the plan and planners, with management under pressure to reach output goals. If getting big and becoming bigger is the test by which performance is centrally measured (and, as a generality, this is the norm), then that is how managements will behave irrespective of the costs involved.

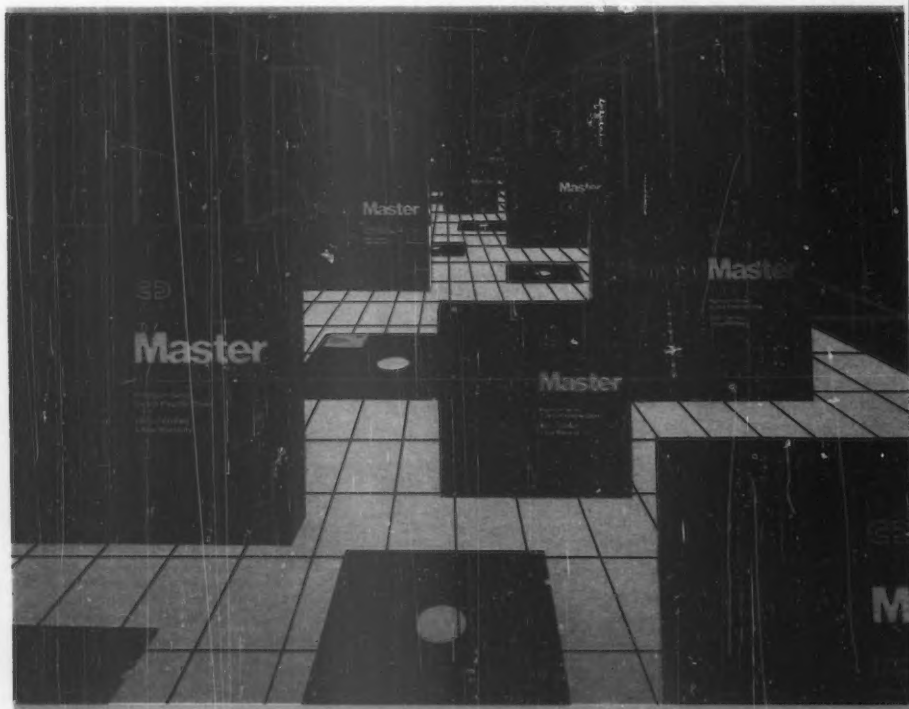
The consequences over time are dire in an economy with substantial shortages and deficiencies arising from flawed structures. The unofficial networks cannot make up this lost ground. Many in the West bemoan a tendency (most noticeable in corporate America) to be guided by the quarterly bottom line, and accusations are often bandied about that much U.S. management is selling short the national future. But the U.S. problems in this area are minimal in comparison with the ones in the Soviet bloc. There, the same tendencies are complemented by another: that of Soviet managers and administrators to hoard whatever is available and to cut back on forward investment to meet current output targets. All these inflexibilities mean that though the productivity of the Soviet bloc improves, it does so very slowly. A high price is being paid.

The problem can be put this way. Not all Soviet information is equal, capable of being tested by some sort of objective and neutral standard. This principle goes much further than the tendency of governments to hide what information they can, or at least try to, when they consider it embarrassing or sensitive.

The Soviet problem is a different one. It is that, to paraphrase George Orwell in *Animal Farm*, all data is equal, but some pieces of data are more equal than others. There are two primary causes.

Much economic data is highly suspect. It is based on reports by those down the chain to those higher up that they have accomplished their tasks; and whether they have or not cannot be routinely, objectively tested. The system is not set up to make that possible. A fact is not necessarily a fact in the Soviet bloc. Its truth is dependent upon who issues it and for what purpose.

But this is not the only problem. As Milovan Djilas observed years ago, the Soviet Union and the other Comecon countries are run by a ruling class. It is a large group, which perpetuates itself, although Soviet orthodoxy would deny its existence, and as the system is not flexible enough to have a plurality of routes to the top (ideology alone would in any case deny the possibility), then



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reality intervenes.

The reality of life in the Soviet bloc is that access to the goods in short supply depends not on something that can be objectively measured, but on privilege. Now privilege is a slippery quantity, with data which varies unpredictably in value over time. And as privilege cannot be openly acknowledged, the Soviet Union is faced with an information structure more than difficult for computer systems to handle. There is little doubt that such systems could be set up, but the political costs would be too high.

Computerized reservation and sales systems, for example, are part of the infrastructure of the information society we have been evolving for more than a quarter of a century, and without them some service industries could not run. They hardly exist within the Soviet bloc.

Reservation systems also give an indication of market demand. The Soviet leaders know quite well that the demand would be there for almost anything. They have no

wish to be reminded of the system's shortcomings. And, in any case, if such systems were set up giving access to all, other privileges would have to be found to keep the currently privileged in line. The Soviet bloc, it can be said, makes creative use of shortages (as do all systems where they can); it has just taken the principle further than most.

But what of the future, the next generation? The outlook for the Soviet bloc is bleak indeed. The evidence in the West shows that the impact of information technology upon a country's elites is both centripetal and centrifugal. Initially, it strengthens the grip of the specialists over their specialty. It makes for greater mastery among those so inclined, and the knowledgeable can become even more so. The technology resources give them an enhanced ability to defend their interests across society and to seek to influence it by stressing the importance of whatever it is that they do to the total outcome of society.

Later, however, it is hard to lock these resources up and keep them the preserve of the professional elites. To computerize data means to order it and to strip it of ambiguity or to make the ambiguity explicit; so access can become widespread and undermine the power of the traditional special interest groups. The resolution of the conflicts in interest is not easy, which means that it can begin to take up more and more of the time and energy of the political elite.

For a society to evolve in the direction of becoming an information society, it is necessary that both tendencies be present. Indeed, the second cannot be undergone unless the first has or is being gone through. So, if it is to compete seriously, the Soviet bloc has to find mechanisms to obtain the appropriate technology, either by its own endeavors or based on others', and then let that technology permeate its society.

And this is where even more problems lie. Cheap electronics (and the appropriate social structure) breed



organized data and software to make use of that electronics. Were the Soviet bloc to acquire the first, it must allow for the development of the second and third. But the software and data that can be centrally planned, originated, approved and organized are a very small part of the amount required and are mainly concerned with basic and routine processes. The truth is that the nearer one gets to operations, the closer the requirement for user involvement becomes — and not just in use, but in creation. And that, as experience shows, breeds independence.

Another problem that faces the Soviet bloc is the direction in which the broad technology of computing and information technology is evolving. Let us be pessimistic and say that the fifth-

generation computer to which Japan is committed (and, therefore, for competitive reasons, all OECD countries) is 15 years in the future. The fifth generation is in part a generation of "intelligent" machines, information-handling engines, based on general principles. Analogously, the engines can be driven through information as one can drive a car across a physical landscape.

The fifth generation is an information-handling tool of a power at least two or three orders of magnitude greater than anything available today. Such power obviously extends the range of our information-handling activities. But the fifth generation will not be a sudden jump. It is a general target that will be approached in steps, and we can expect that each step, having an advantage over

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the then current equipment, will be marketed and used.

By the time the fifth generation arrives, we can expect that many Western societies will have had serious exposure to advanced information technology. Both elites and workers will be linked to information resources, for subjecting those resources to analysis and judgment and for communications among themselves.

The quality of ease of use will have been transformed, as will the images that can be created and handled, whether arising from graphics or from text.

These societies will not only be prepared to use information technology but encouraged to do so. Economics makes that necessary, for the heavy costs are up front in the design, creation and manufacture of the systems, whatever they may be. The costs of production for market after the initial semiconductor-based devices have been made and tested are relatively trivial.

Also coming up are more conventional computer systems of very great power indeed, two to three orders of magnitude over the most powerful systems in use today. We are within reach of systems that might enable the Soviet bloc to do effective central planning — planning, after all, can be by consent — if it had the necessary information-handling habits.

In OECD countries, where these are the norm, we are going to find ourselves with tools to test hypotheses and plans at quite low levels of

organization. There will be little fear at the top of the use to which those resources might be put.

At mundane levels, they will enable us to do serious and detailed analysis and forecasting over longer time scales, to test the stress and strain of complex mechanical assemblies, to design even more complex electronics and to discover, analyze and test new biological and chemical-based substances and products. These are all obvious uses.

We are also creating a wide variety of telecommunications facilities that are now rapidly cross-connecting the industrialized part of the globe. From these interconnections the Soviet bloc is, for real day-to-day operations, almost totally absent. It is absent by choice. Its direct telecommunications links to other countries are few.

Strangely, the bloc's telecommunications connections between its allies do not seem to be very great. There is much talk of plans, both internally and externally, but surprisingly little movement. Since the mid-1970s, the International Institute for Applied Systems Analysis (IIASA) near Vienna has been creating a packet-switched network to allow interworking among its geographically contiguous neighbors and access to data bases held remotely. The network includes Austria, Czechoslovakia, Hungary and the Soviet Union. Traffic between the first three is heavy, but with the last is said to be minimal. What traffic there is originates in the Soviet Union and seeks data held else-

where; reputedly, the imbalance is substantial.

The Soviet Union is quite happy to look out. It does not, it seems, like others peering in.

The West is rapidly putting up data bases containing much of the world's professional data, as well as bibliographic data, and developing the tools with which to search it interactively and in new ways. From this research, the Soviet bloc is noticeably absent. Specialists say that the papers in the field that originate in the Soviet bloc indicate the Soviets are relying largely on languages and approaches similar to those we pursued 10 to 15 years ago. We have rejected these languages because they are unsatisfactory.

There is a Soviet user community, but much of the time it works on foreign equipment and searches data bases resident abroad. As a general-ity, however, neither the foreign equipment nor the access to those foreign data bases is available to the bulk of the community that might wish to access it.

In the West, the ongoing transformation of industries is likely to speed up, and the capabilities of existing industries heavily dependent on the use of information will be much magnified. This development will continue to extend the role, scope and dependency of the economy on data, information and knowledge handled via electronics.

Break with past, present

The problem that faces the Soviet bloc is that to breed a competitive

society, for the triumph of communism to happen, it must breed not just an educated society; it must breed an informed society. Concentration on ideology, as in the Andropov-inspired directives, may be necessary if the faith is to survive, but that is not enough. Indeed, it could be argued that this is the wrong way to look. To compete requires the development and rapid expansion of electronics industries. To move in these directions, the bloc must break not only with the past but with the present.

Far from the Soviet bloc catching up, the consensus seems to be that it is falling even further behind. The snag with a philosophy of copying our successes is that by the time they have been copied, we have already moved on. Installation volumes in the West are now sufficiently large for synergistic effects to be felt; in other words, changes may accelerate.

The Soviet bloc is caught in a trap. And it is a trap of its own making, not ours — at least not by design.

About the author

Rez Malik is contributing editor of *Intermedia*, a journal published in London by the International Institute of Communications. He is London and roving correspondent covering the French computing industry for the paper *01 Informatique*. Recently he has been contributing a series on the social, economic and political consequences of information technology to *The Times*, London.

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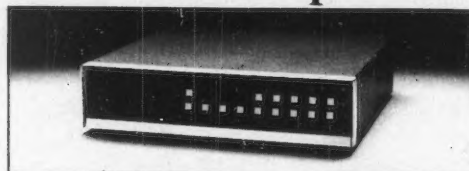
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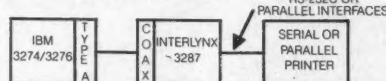
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COMMUNICATIONS

AT&T's ISN: The unconventional net eludes categories



DATA STREAM

John Dix
CW Senior Editor

AT&T's recently announced Information Systems Network (ISN) is hard to categorize. It does not fit neatly into any of the conventional molds for devices that do the kinds of things it does.

While company officials heralded the ISN as a local-area network at the product's unveiling, AT&T has painstakingly avoided calling it a local net in product literature. The ISN, releases specify, is a "data networking product for business" and "more than a local-area network."

The distinction has surely been made for marketing reasons, possibly to avoid having to explain why it looks different than other local nets or, more skeptical-

ly, to play on the difference to make ISN out to be more than a local net.

ISN does not resemble popular local-area networks in that it uses central network control and a star wiring configuration. By comparison, other local-area networks use distributed access control and typically interconnect devices with a shared cable.

Given the centralized control box and the wiring scheme, it is tempting to try to compare ISN to a data switch. Those devices, however, are true switches, used like a telephone switch (private branch exchange) to establish circuits between devices. The technology used is called — aptly enough — circuit switching.

ISN uses packet switching and cannot be classified as a data switch.

For all intents and purposes, ISN can be classified, on the merits of its features and capabilities, as a local-area network.

In fact, ISN goes one step beyond coaxial-cable-based systems in its ability to use — where available — existing telephone wiring.

While outwardly different from most local networks, ISN can be viewed from another angle that reveals some similarities to existing products.

Consider Ethernet. This network uses a single coaxial cable in a bus fashion — that is, a long cable that goes nowhere — off of which drop cables are run down to supported devices. When a device wants to communicate with another machine on the network, it sends a signal up the feeder cable to the bus, where it propagates in both directions.

ISN does not handle communications in quite the same way, but there is a similarity between the Ethernet bus and what is at the heart of ISN.

The central box in ISN, called the

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INSIDE

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SDC net products use DOD protocols

By Bryan Wilkins
CW Washington Bureau

WASHINGTON, D.C. — System Development Corp. (SDC), a Burroughs Corp. subsidiary, has introduced a line of local-area network products that embrace the transmission control protocol and internet protocol developed by the U.S. Department of Defense (DOD).

MIL/INT is a group of off-the-shelf products that implement the DOD's TCP/IP protocols. TCP/IP has been specified as standard by the DOD because its security level is more complete than the local net standards promulgated by other network standards.

The MIL/INT products include a complete broadband local net; gateways that interconnect networks, or that provide interchannel linkage on the same network; front ends that connect host computers and workstations to the local net or to a long-haul network; terminal bus interface units and concentrators that connect one

or more terminals, workstations and peripherals to the network; and a control center to provide fault detection, performance monitoring and network management.

SDC said that the MIL/INT will be marketed specifically to the military market, but that it is also applicable to the private sector, where security considerations are paramount and interconnectivity and compatibility is a necessity.

Prices for a typically configured MIL/INT network, with a minimum of 250 logical connections, start at \$150,000, SDC said. This results in an average cost per connection of \$700. A larger network, supporting more than 2,500 logical connections, could cost less than \$600 per connection.

Gateways needed to link an MIL/INT local network to a packet-switched network cost \$30,000 each, SDC said.

Additional information is available from SDC, which is based at 2500 Colorado Ave., Santa Monica, Calif. 90406.

AT&T to market four converters from PCI

MORRISTOWN, N.J. — AT&T Information Systems recently announced that it will market four versions of Protocol Computers, Inc. protocol converters to link its computer systems to data networks, including those using IBM architectures.

The protocol converters are said to allow users with AT&T terminals, computers and telecommunications systems to connect with bisynchronous and IBM Systems Network Architecture (SNA) hosts.

The controllers are scheduled to be available by the end of July, a spokesman said.

The 4276 Protocol Converter reportedly enables any Ascii, asynchronous terminal to communicate with an SNA host using IBM's Synchronous Data Link Control (SDLC) protocol. It costs \$2,900 for three ports and \$4,300 for seven ports, according to the spokesman.

Emulates IBM 3271 controller

The 4271 Protocol Converter is said to allow use of virtually any Ascii device in a bisynchronous network through emulation of an IBM 3271 controller. The three-port version costs \$2,900, and the seven-port version costs \$4,300.

The 5274 Protocol Converter was designed to link configurations of bisynchronous terminals to an SNA/SDLC host. It reportedly allows existing clusters of bisynchronous IBM 3271 and compatible terminals to communicate with the SNA host through the 5274 without changes in procedures or equipment.

The 5274 costs \$4,900.

The 5776 Protocol Converter reportedly lets bisynchronous 3780 devices become compatible with SNA/SDLC protocols. It is said to save the cost of replacing terminals.

The 5776 costs \$3,100, according to the vendor.

More information is available from AT&T Information Systems, which is located at 100 Southgate, Morristown, N.J. 07960.

Honeywell enters tenant services mart

MINNEAPOLIS — Honeywell, Inc. recently announced its entrance to the shared-tenant services market.

The company reported that it plans to provide office building owners and tenants customized telephone, lighting, security and information systems.

With its Deltaplex private branch exchange (PBX) as a key element, Honeywell's services will include buildingwide wiring for telephones and data communications and tenant access to on-site Honeywell computers.

Company spokesman James Russell said the services will vary from building to building, and that current prospective customers are building structures of 500,000 square feet or more. He said a minimum system will include Honeywell's traditional building services, such as energy management, fire alarms and lighting control.

Honeywell expects to use the wiring, including fiber-optic cable, in a new building

to support not only those building services but data and voice transmissions.

Russell said Honeywell will supply end-user equipment such as telephones, workstations, PBXs, local-area networks and personal computers to tenants, and will link that equipment into the buildingwide telecommunications system. Tenants will be able to access the building's central computer on a shared-cost basis, according to Honeywell.

The venture, which involves four Honeywell divisions — the Commercial Division, responsible for building controls; the Communications Division, which is marketing an Ericsson, Inc. PBX under the Deltaplex name; the Action Communications Division, which markets a long-distance service; and the Information Systems Division — will have Honeywell entering into partnerships with the building owners.

Honeywell is located at Honeywell Plaza, Minneapolis, Minn. 55408.

COMMUNICATIONS

CATV bill wins committee OK

WASHINGTON, D.C. — Legislation specifying how CATV networks will be regulated was approved by the U.S. House Energy and Commerce Committee recently, while action by the full House is expected this summer. A key provision of the bill (H.R. 4103) concerns regulation of services that compete with the offerings of local telephone companies.

The House bill says all "noncable" services are subject to the jurisdiction of state or federal regulatory authorities.

"Cable services," which include one-way video and other "information services generally available" to CATV subscribers, are not subject to regulation.

Last year, the Senate passed a bill (S. 66) that would allow CATV network operators to offer private-line services on a deregulated basis, but not switched-voice services. This is one of several differences between the two measures that will have to be resolved if and when the full House passes H.R. 4103.

Although the Communications Workers of America and the Pacific Telesis Group, one of the seven regional telephone holding companies, approved the provision of H.R. 4103 relating to communications services, a knowledgeable House source stated that the other five regional telephone holding companies continue to oppose it.

AT&T offers intelligent modem

MORRISTOWN, N.J. — AT&T Information Systems has announced the Dataphone 2224/FDX, a full-duplex intelligent modem intended for use on the dial-up network.

The device operates at 300, 1,200 and 2,400 bit/sec and is compatible with the AT&T 100 series and 212AR modems.

The modem features a dialing option, whereby any of the 36 telephone numbers in its internal directory can be dialed automatically and redialed until a connection is made.

It reportedly detects and adjusts to the speed of the modem on the other end, works with synchronous and asynchronous terminals and operates with full- and half-duplex terminal

devices.

It also is said to perform end-to-end tests, as well as local loopback, digital loopback and remote digital loopback tests.

The modem is now available in controlled amounts and will be available generally in February in four configurations.

The rack-mount modem without autodial costs \$1,295; the rack-mount version with autodial costs \$1,395; the stand-alone version without autodial costs \$1,045; and the stand-alone version with autodial costs \$1,265.

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Correction unit
out for modems

YOUNGSTOWN, Ohio — Western Datacom Co. has announced a central-site, error-correction device for use with many asynchronous modems.

The rack-mountable, microprocessor-based 1023 Error Controller is compatible with a standard Racal-Vadic, Inc. chassis. It implements the Microcom Network Protocol, as used by GTE Telenet Communications Corp. and other packet-switched network carriers.

In practice, the centrally located device sits between an asynchronous modem and the transmission line. It buffers characters from the modem to build 64-byte packets, to which it appends a 16-bit cyclic redundancy check. If the data is corrupted in transmission, the check will fail and cause a check for retransmission, the company reported.

The 1023 is said to support all standard bit rates up to 4,800 bit/sec. It also features compatibility with many modems, including AT&T 212A and 103, Vadic 3400 series and modems using programmable RJ41S telephone plugs, the company said. The device costs \$438.

Western Datacom is at 5083 Market St., Youngstown, Ohio 44512.

PROTOCOL
CONVERTERS

INNOVATIVE ELECTRONICS, INC.
MC-8051

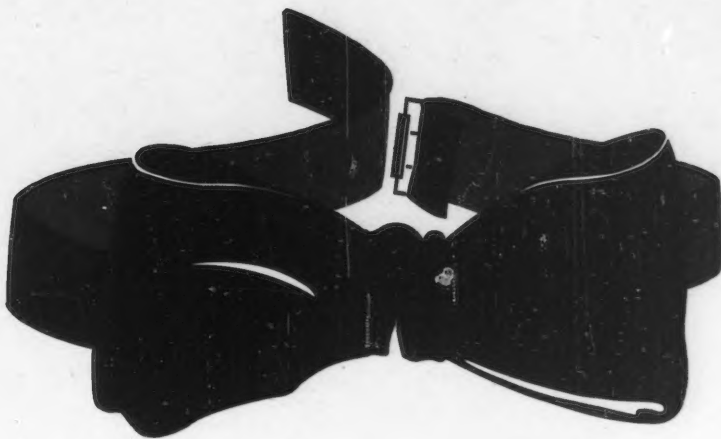
Innovative Electronics, Inc. has announced a protocol converter that is said to allow up to nine asynchronous ASCII terminals, personal computers or printers to communicate with IBM's System/34 or 38.

The MC-8051 appears to the host computers as an IBM 5251-12 display station. It is said to allow inexpensive asynchronous devices to replace or supplement IBM workstations and display stations, such as the 5251-11 workstation and the 5292 display station, and to let low-cost printers emulate the IBM 5256.

The product is available now in configurations of five, seven and

Continued on page 98

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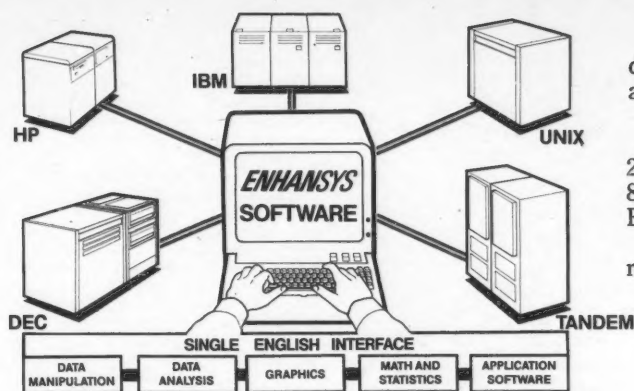
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COMMUNICATIONS

Continued from page 94

nine asynchronous ports, permitting direct connection or dial-up accessibility. Connected devices are supported with an RS-232 interface.

Prices are \$4,650 for the five-port version, \$5,250 for seven ports and \$5,950 for nine ports.

Innovative Electronics, 4714 N.W. 165th St., Miami, Fla. 33014.

MULTIPLEXERS/ MODEMS

TIMEPLEX, INC. DTM48

Timeplex, Inc. has introduced a wideband multiplexer that is said to perform statistical and time-division multiplexing (TDM) at a data link

speed of up to 64K bit/sec.

The DTM48 was designed to support up to 48 user ports and is targeted at government accounts. It reportedly lets the network planner take advantage of a software-programmable time-division and statistical multiplexer in a single enclosure.

According to the company, when the time-division multiplexing capabilities of the device are tapped, the DTM48 offers transparent channels for transmission of any bit pattern. That ability is said to permit encryption to be applied externally to the multiplexed data stream.

It reportedly features an encryption synchronization feature that delivers a signal to external encryption devices upon detecting a loss of synchronization on the data link.

The user reportedly can set any mix of TDM and statistical ports at

speeds up to 9,600 bit/sec, and with an optional port expansion module can use two TDM ports at speeds greater than 9,600 bit/sec.

Delivery is scheduled for the fall.

The DTM48 costs \$8,375 when equipped with four TDM ports, four statistically multiplexed ports and a standby data link.

Timeplex, 400 Chestnut Ridge Road, Woodcliff Lake, N.J. 07675.

NETWORK SERVICES

DIALOG INFORMATION SERVICES, INC. Dialnet

Dialog Information Services, Inc. announced recently that it will build a dedicated packet-switched network

for users of its approximately 200 data base services.

Dialnet reportedly will offer 300 and 1,200 bit/sec dial-up support in major cities throughout the U.S.

The vendor reported that high-volume Dialog customers may install direct leased-line connections to Dialnet from their locations at speeds up to 9,600 bit/sec.

Dialog, a subsidiary of Lockheed Corp., is an on-line information retrieval service that offers about 200 data bases dealing with areas such as business, medicine, law, chemistry, technology and current events.

Access nodes are scheduled to be installed in western U.S. cities such as San Francisco, Denver and Portland, Ore., in August.

Dial-up access will cost \$6/hour. *Dialog, 3460 Hillview Ave., Palo Alto, Calif. 94304.*

SOUTHERN NEW ENGLAND TELEPHONE CO. Digital Data Service

Southern New England Telephone Co., a local telephone company in Connecticut, has announced the availability of Digital Data Service for businesses in that state.

Digital Data Service, a digital private-line transmission service, is designed to let businesses transmit data at speeds of 2.4K, 4.8K, 9.6K and 56K bit/sec with 99.5% accuracy, the company reported.

Local digital service for the three slower speeds is \$550 for installation plus \$120/mo. For the 56K bit/sec service, the price is \$625 for installation plus \$275/mo. An interwire center digital channel is an added \$3.75/mile per month for the three slower speeds and \$4.75/mile per month for the 56K bit/sec speed. Multipoint service is \$15/mo for all speeds.

Southern New England Telephone, 227 Church St., New Haven, Conn. 06506.

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ISN from page 93

packet controller, is built on what the company calls a "short bus." Instead of running an Ethernet-like bus by devices to be supported, the short bus is housed in a single enclosure to which the "drop cables" of network nodes are extended.

It should become evident that such a cabling scheme calls for much more wire than other bus or ring network topologies. ISN, however, uses spare telephone wires for the majority of its wiring needs (telephone systems are typically wired with one or two pairs of wire that are needed for simple telephone use).

Use of existing wiring contributes to the low average cost per port of ISN, estimated by the company to range between \$400 and \$500. Other local networks — excluding small personal computer networks — often exceed twice that figure. Wiring costs contribute to the difference, but those nets also require each node to have a cable connection device (either a transceiver or a modem) and a device interface that houses the smarts to achieve network access.

Comparing those nets to ISN is actually unfair at this point. ISN only provides support for asynchronous communications at speeds to 19.2K bit/sec, a far cry from the megabit speeds achievable on other networks. Synchronous support is a capability AT&T promises for the future.

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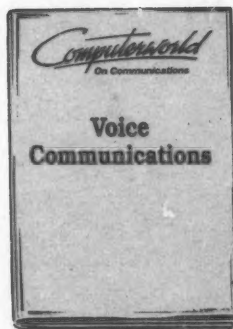
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SYSTEMS & PERIPHERALS

Fluid bearing can increase disk capacity, maker says

By Tom Henkel
CW Staff

NASHUA, N.H. — A high-tech manufacturing firm here claims to have developed a prototype fluid-based bearing unit that may allow disk drive manufacturers to pack more data onto conventional-size platters.

Ferrofluidics Corp. uses a ferrofluid, or magnetic liquid, film-bearing spindle that can reduce the amount of wobble and minute random motions in rapidly turning disk platters to under 5 microinches, according to the firm's chief financial officer, Frank Bloom. Bloom said conventional ball-bearing disk spindles have a wobble rate of approximately 25 to 50 microinches.

Fluid bearings have been around for some time, Bloom explained, but the technology has been expensive and difficult to work with because fluid had to be pumped into the bearing at a constant pressure. The ferrofluid bearings developed for disk drives, Bloom said, do not require pressurized fluid and are therefore less expensive.

By stabilizing the unpredictable gyrations of a disk platter, Bloom said it is possible for disk drive makers to increase a disk platter's recording track density without jeopardizing data integrity. On magnetic disk drives, recording tracks could be packed roughly five times more closely with the ferrofluid bearing spindle, Bloom said.

See DISKS page 105

NSF to allow researchers access to large computers

By Bryan Wilkins
CW Washington Bureau

GAITHERSBURG, Md. — The National Science Foundation (NSF), in an effort to make supercomputer access time available to researchers who need the facilities to run large-scale computational programs, announced last week its \$6 million program to make computer time available at three locations.

The three sites are the University of Minnesota in Minneapolis, where 2,000 hours will be available on the university's Cray Research, Inc.'s Cray 1/A; Purdue University in West Lafayette, Ind., where 1,800 hours will be available on a Control Data Corp. Cyber 205; and Boeing Computer Services Co., where 1,400 hours will be available on two Cray 1/S systems in Seattle.

Applicants for the use of the NSF's initiative in supercomputing must make the request through the appropriate division of the foundation, depending on the nature of the program they seek to run, such as mathematics, engineering, physics or earth sciences.

The NSF is starting to process applications for the program. It has made a budget request seeking \$30 million to \$40 million to continue the supercomputer program in fiscal year 1985.

Academic researchers have maintained for some time that the resources of too few supercomputers, many of which are located in government installations, are made available for basic research.

■ Bytronix Corp. has announced the Mikron Series 400 minicomputer. The unit is said to be more powerful than the firm's earlier Mikron 600 series processors/102

■ Cadnetix Corp. unveiled a Unix-based computer-aided engineering workstation/102

INSIDE

Turnkey
Systems/104

Processors/105

Introduction of new products can save or sink a firm



HARD TALK
Tom Henkel
CW Senior Editor

Data General Corp. and Amdahl Corp. are rarely mentioned in the same breath. The two firms operate in different segments of the processor business. But both are currently caught up in a period of change. One firm has used a new series of processors to boost sagging profits. For the other, a new series of processors could be the first blow in what may be a long and damaging political battle.

Two years ago, DG was in serious trouble. The firm's 1982 revenues were half of what they were the year before, and some industry watchers believed DG would never recover from financial hard times.

In 1983, DG replaced its aging 16-bit minicomputer line with a series of 32-bit superminicomputers, the Eclipse MV/4000, MV/8000II, MV/8000C and MV/10000. In the first half of 1984, DG has continued its rapid-fire product announcements with three specialized versions of the low-end MV/4000 processor, the GW/4000 series graphics workstations, the DS/4000 series graphics workstations and the MV/4000 SC small cluster

system configuration.

The strategy appears to be working. DG is now riding high on its fifth successive profitable quarter. Has the company turned the corner? The final results are yet to come, but it appears DG is on the right track.

Amdahl's problems are not rooted in financial heartaches but in an internal power struggle. Tokyo-based Fujitsu Ltd., which owns 49% of Amdahl, appears to be flexing its muscles. A Fujitsu spokesman recently confirmed that the firm is seriously thinking about exporting its two supercomputers, the VP-100 and VP-200, to the U.S., and Amdahl is

See DG page 104

Computer graphics seen essential to factory automation

By John C. Rowe
Special to CW

When the term "factory automation" is used, one of the first applications that comes to mind is the use of computer-based graphics to design a product.

While many graphics-based design systems have been implemented, a large majority of these installations involve prototype installations where a few terminals are deemed sufficient to serve up to 50 or even 100 engineers and draftsmen. In many of these organizations, a lot of work remains before the use of graphics is integrated throughout the life cycle of an item.

Integration of graphics applications throughout the industrial organization is a difficult task. Implementing such a system means an increasing functional and geographic dispersal of graphics terminals throughout the company. These terminals must serve a variety of specialized functions from a single data base. These functions include:

- Engineering design — both geometry creation and retrieval.
- Engineering analysis.
- Process planning.
- Parts programming for numerical control.
- Quality assurance and inspection.
- Service documentation.

Management of all the available graphics data about an item, especially when it consists of the graphics data for the component subassemblies and parts of an assembly, is an extremely complex task. It also places large demands on current hardware and software technologies. This is especially evident in existing turnkey applications installed on minicomputers. A diversified data base of graphics and geometric information along with supporting text requires file volumes approximately two orders of magnitude (100 times) larger than that typically encountered in commercial applications for the same item population.

Creation of an increasingly large and complex multifunction data base for factory automation needs large amounts of file storage for graphics data. Additionally, large amounts of real processor memory are needed to be accessed by the user in a transparent fashion for the solution of large, complex mathematical functions using simultaneous

equations, vector algebra and so forth. If a large superminicomputer or mainframe computer is used for this, the direct and indirect costs are high. Not only is there the cost of the host and its allied storage, but typically the terminals are attached to the host in a star configuration. All terminal-based activity requires communications to and from the host. Therefore, use is made of high-speed communications links or channels to get rapid screen response from the host. Alternatively, certain systems generate the screen displays locally, but here, response times are unpredictable, since they are based on the need to interrogate file data at the host.

Graphics applications typically average about one display-altering operation every five seconds, but they can hit peak activity bursts of one operation every second. To avoid distraction of the graphics operator, there is a requirement for relatively fast display response independent of both communications and host processor contention. General-purpose, stand-alone graphics workstations support the diverse applications needs of users. The key is that the workstation must have a large amount of local memory and addressing that permits it to be accessed transparently.

See GRAPH page 105

Rowe is a principal of J.C. Rowe & Associates, a Cleveland-based consulting firm specializing in factory automation and computer-aided manufacturing.

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Abraxas has designed the Systems II electronic file card system. Each package contains a program disk and a manual, custom-tailored to each specific market. The program is laid out by the end user, and information is typed into the system and recorded onto the floppy disk. The program runs on the Commodore 64™ with one disk drive and can operate with all types of printers.



bbj Computer Services Pty. Ltd.

Manufacturer of the TODAY business application builder which allows the computer user to design and implement his own programs within the UNIX based system. The user simply specifies his business application and the system leads the user through the application design and development process, with no programming involved. The company also produces the HP3000 Software Package range which covers plant maintenance, supply, costing and financial software.

Infolink Australia Pty. Ltd.

Infolink has developed a high-speed on-line data entry system for IBM and compatible computer systems using MVS and DOS/VSE. The KeyPlus system achieves high-speed response by working directly with VTAM and allows direct keying of data into the mainframe. KeyPlus uses standard operating system JCL and libraries. No special terminals or systems software are required.



Business Model Systems Pty. Ltd.

Developer of the Business Modeler product range for financial and managerial monitoring of an organization. The Business Modeler can also be used for long-range corporate planning. Program versions have been written for use in all major computer brands, including IBM, NCR, Honeywell, Prime, Wang and Hewlett Packard.



IMS Integrity Management Service Pty. Ltd. American Integrity Systems Inc.

IMS has produced the Ascent Management Accounting Series software package, marketed by American Integrity Systems Inc. The series can be used on virtually any brand of microcomputer and enables the user to add peripherals, new modules and even new hardware as required. A Software Update Plan is offered, providing users with enhancements as they become available.

SYSTEMS & PERIPHERALS

Cadnetix announces desktop CDX-9000 CAE workstation

BOULDER, Colo. — Cadnetix Corp. has announced the CDX-9000 CAE (computer-aided engineering) workstation for documentation processing, hierarchical schematic design and logic simulation in a desktop system.

Together with the company's CDX-5000 CAD (computer-aided design) workstation, the CDX-9000 forms an electronic design automation system which may be linked with Xerox Corp.'s Ethernet local-area network interface, the company said.

Cadnetix offers HBB Softron, Inc.'s Cadat 12-state logic simulation

and fault simulation packages for logic verification and test development. Berkeley 4.2 Unix with virtual memory will be a standard feature of the CDX-9000 and will support the C and Pascal programming languages, the company said.

The CDX-9000 contains a 32-bit Motorola, Inc. 68010 microprocessor; 1M byte of random-access memory (RAM); an 814K-byte, formatted, 5¼-in. floppy disk drive; a 35M-byte, formatted Winchester disk; a 17-in. black-and-white monitor (1,024 by 800 pixels); keyboard and mouse, the company said.

Packaged with Unix, documentation processing, hierarchical schematic design, a logic simulator and timing analyzer, the CDX-9000 is priced at \$36,500, according to the vendor.

The CDX-9100 contains the same 32-bit Motorola 68010 CPU, ¼M-byte RAM, an 18M-byte, formatted Winchester disk and an 814K-byte, formatted, 5¼-in. floppy disk drive. Packaged with Unix, the documentation processor and a hierarchical schematic design package, the CDX-9100 is priced at \$27,500 in quantities of four to nine, the company said.

The Logic Design and Verification System is also available in a color version. Called the CDX-9000c, it contains a 19-in., 1,024 by 800-pixel color monitor; an 814K-byte, 5¼-in., formatted floppy drive and a 35M-byte, formatted Winchester drive. It is priced at \$55,000 in quantities of four to nine, the company said.

Shipments of the three products will begin in September.

Cadnetix is located at 5797 Central Ave., Boulder, Colo. 80301.

Bytronix offers enhanced mini

FULLERTON, Calif. — Bytronix Corp. has announced the Mikron Series 400 minicomputer, said to improve CPU instruction execution time to 400 nsec from 600 nsec in the earlier Mikron Series 600 models.

The Mikron 400 is available as a stand-alone CPU with various disk or tape controllers and multiplexers. It is also available as a packaged subsystem with storage devices of varying capacities.

A typical subsystem consists of the Mikron processor with 128K bytes of main memory, a multiplexer with TTY I/O and four ports, disk controller and power supplies packaged in a single, tabletop cabinet.

Disks packaged in that manner are 5¼-in. Winchester with capacities of 20M to 50M bytes. Alternate disks, fixed and removable media and higher capacity media may also be used.

The Mikron 400 runs on an operating system written for Data General Corp. emulation. The price for the Mikron 400 is \$5,000 for the 128K-byte CPU, multiplexer and controller in a cabinet with a power supply.

Bytronix is located at 2701 E. Chapman Ave., Fullerton, Calif. 92631.

See us at Booth H254 at the
National Computer Conference
in the Hilton Hotel, Las Vegas
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For further product information circle the appropriate reader service number or:
Ask the Australian Trade Commissioner



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SYSTEMS & PERIPHERALS

DG from page 101

its primary target as a marketing vehicle.

The situation is an interesting one. Amdahl has been selling Fujitsu's IBM-compatible processors for some time — but to mainframe users. The supercomputer business is quite different. While the sketchy details of the Fujitsu supercomputers indicate the machines offer some degree of IBM compatibility, Amdahl has no experience in

dealing with clients whose primary interest is large-scale scientific processing.

The market for multi-million-dollar supercomputers is considerably narrower than the IBM mainframe market. Industry watchers estimate there are fewer than 200 supercomputers in the world — and most of those have been sold to government agencies for things like weather forecasting and nuclear research.

Also, if Amdahl decides to

get into marketing supercomputers, it will be entering a marketplace that IBM, Burroughs Corp. and, to some degree, Control Data Corp. decided to exit. IBM and Burroughs both killed supercomputer projects, contending that the market was too narrow to justify the high R&D costs associated with supercomputer development. CDC still markets its Cyber 205 supercomputer, but spun off its supercomputer development group into a start-up

company called ETA Systems, Inc. In doing so, CDC also said the high development costs made it difficult to maintain a supercomputer project and a commercial processing business at the same time.

It is ironic that the same business decision, offering a new line of computer systems, could prove the solution to one company's problems and, at the same time, be a potential cause of problems for another company.

For DG, moving from a 16- to 32-bit architecture was an evolutionary process. The move put the company in a better position with its competition and offered existing DG users a growth path.

For Amdahl, moving into the supercomputer business will mean stepping into a whole new world — one that is unfamiliar to the Amdahl sales and support staff and one that will mean very little to most current Amdahl users.

TURNKEY SYSTEMS**TEKTRONIX, INC.**
8562 system

Tektronix, Inc. has announced the 8562 software development system, said to extend the 8500 line to support up to eight users currently in the company's Tnix multitasking software development and integration environment.

Based on the Digital Equipment Corp. LSI-11/73 central processor, the 8562 is compatible with other 8500 series systems, the company said.

The 8562 includes the Tnix operating system, compatible with Unix Version 7, the 11/73 processor, 1M bytes of random-access memory, a floating-point processor, 40M bytes of hard disk storage, eight user ports, two line printer ports and an 8-in. floppy disk drive, the company said.

An optional second 40M-byte drive can be housed within the standard enclosure, and a General Purpose Interface Bus (Gpib) interface is available to access a nine-track tape or additional instrumentation. The 8562 communicates with DEC's VAX or other mainframes via the Unix UUCP protocol.

The 8562 is said to be compatible with the 8500 series microprocessor development systems and supports most 8- and 16-bit microprocessors, including the Motorola, Inc. 68000 and 68010, and the Intel Corp. 8086/80186.

Continued on page 105

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UNIX System V is fully supported by AT&T and backed by a multimillion-dollar research and development program at AT&T Bell Laboratories. You can be assured that UNIX System V is

SYSTEMS & PERIPHERALS

Continued from page 104

The 8562 costs \$36,000, with August deliveries. Tektronix, P.O. Box 1700, Beaverton, Ore. 97077.

PROCESSORS

MDB SYSTEMS, INC.
Model MLSI-JFEP11

MDB Systems, Inc. announced a front-end communications processor that uses

Digital Equipment Corp.'s J11 chip to allow coprocessing on DEC's Q-bus. The Model MLSI-JFEP11 enables small systems to have the processing power of larger systems, the vendor claimed.

The Model MLSI-JFEP11 features an on-board 512K-byte dual-ported memory, two serial ports and an external parallel bus.

It costs \$4,950.

MDB Systems, 1995 N. Batavia St., Box 5508, Orange, Calif. 92667.

DISKS from page 101

In theory, Bloom said, recording tracks could be packed even more closely than the fivefold reduction; but interference can become a problem on magnetic disks past the fivefold mark, thus jeopardizing data integrity. He added, however, the same ferrofluid-bearing spindle can also be used on optical disk drives. In an optical unit, Bloom said, data can theoretically be packed much

more closely because there is a reduced risk of interference.

Ferrofluidics has produced prototype ferrofluid spindles that, Bloom said, are being evaluated by disk drive manufacturers. He added the company is now preparing to produce volume quantities of the bearings, but would not estimate when volume quantities would be available.

The company is located at 40 Simon St., Nashua, N.H. 03061.

GRAPH from page 101

In addition to the feature of rapid screen response time, dedicated stand-alone graphics workstations should possess the following attributes:

- Large amounts of local processor memory storage addressable in a transparent mode.

- Large amounts of local file storage for data resident at the workstation.

- The ability to perform complex mathematical calculations in a real-time mode at the terminal.

- Net interfaces permitting rapid communications with other geographically contiguous workstations in the same department and production facility.

The final essential element in the development of an integrated system to support graphics applications for automating the factory of the future is the communications network. Where today the initial product offerings are networks that support numbers of similar graphics terminals from a single vendor, the automated factory will require high-speed, factorywide, local-area networks for geographically dispersed workstations from a number of vendors, as well as disk file servers and hard-copy plotter devices accessible from all of the individual stations. The network should support at least a 10M bit/sec data rate to eliminate dedicated point-to-point 9,600 bit/sec and up lines.

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(Formerly Digital Transactions)

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Ottawa, ONT
Business/financial software
(Formerly Quasar Systems)

COMPAQ
Houston, TX
Portable computers
(Formerly Gateway Technology)

DATAGO
New York, NY
Computer stores
(New venture of NYNEX)

DAYLO
Costa Mesa, CA
Software for IBM PC
(Formerly Gilchrist Software)

ECZEL
San Francisco, CA
Computer supplies
(New venture of Crown/Zellerbach)

INFOCOL
Washington, D.C.
Microcomputer appliances
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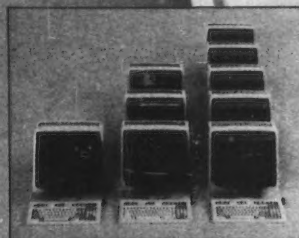
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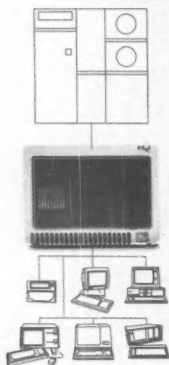
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MICROCOMPUTERS

Analysts skeptical of Compaqs Desktop models called unremarkable

By Paul Korzeniowski
CW Staff

Market analysts interviewed by *Computerworld* late last month were mostly unimpressed by Compaq Computer Corp.'s introduction of four desktop models.

"It is not clear to me why they felt so compelled to introduce a desktop computer," said Everett Meserve, senior consultant at Arthur D. Little, Inc. in Cambridge, Mass. "Running an [Intel Corp.] 8086 at double the speed won't distinguish them for very long. It's not a proprietary technical feature. They should have introduced a knee-top product; it would have given them much better product positioning."

Meserve's sentiment was echoed by Maureen Fleming, an analyst at International Resource Development, Inc. in Norwalk, Conn. "The faster speed is not a significant feature," Fleming said. "It is only

an 8086 microprocessor. There are other systems, such as Tandy Corp.'s [TRS-80 Model 2000], which use an 80186 microprocessor, a faster processor than the 8086. "Sixteen-bit computers are not the direction that the market is heading," she added. "A year from today, there will be a number of 32-bit systems on the market that will render these systems obsolete."

Speed is not a significant buying consideration for one corporate manager, whose company has 17 IBM microcomputers and 20 Compaq machines.

"If it takes 10 minutes to enter data, it doesn't matter if two minutes or 30 seconds are required to process it," the manager claimed. "Other features would have to sell me on the machine. Speed is low on my list of purchasing priorities."

A tape backup facility, standard on the
See DESK page 122

VME-bus-based supermicro debuts

LAS VEGAS — Charles River Data Systems, Inc. plans today to unveil at the National Computer Conference its Universe 2203, a supermicrocomputer based on the VME-bus and the Motorola, Inc. 68000 microprocessor operating at 12.5 MHz.

The Universe 2203 is "the first 32-bit supermicrocomputer available on the VME-bus," said W. Daniel DeLea, Charles River's marketing vice-president. The system reportedly performs at 1¼ million instructions per second.

Charles River's present line of Universe 68 supermicrocomputers uses the Versabus standard, but "we expect the VME-bus, with its Eurocard format, to become the dominant 32-bit bus," said company President Richard Shapiro.

The 2203 runs either the UN/System V, Charles River's implementation of AT&T's Unix System V, or the company's propri-

etary Unos operating system. Both meet the software standards recently accepted by /usr/group, an independent Unix users group, DeLea said.

The Universe 2203 features 512K bytes of random-access memory (RAM), expandable to 2M bytes, and a built-in Winchester disk drive with a formatted storage capacity of 35M bytes.

The system is offered with either an 8-in. floppy disk drive or a ¼-in. streaming tape setup for backup, Charles River said.

A system with 512K bytes of RAM, a 35M-byte disk drive and tape backup will cost \$16,900, the vendor said.

Charles River is also selling the Universe 2203's two-board central processor separately. The VCP 200 costs \$4,000.

Charles River Data Systems is located at 983 Concord St., Framingham, Mass. 01701.

Motorola unveils 32-bit MC68020 microprocessor

NEW YORK — Motorola, Inc. formally introduced here late last month its MC68020 microprocessor, which the company claimed to be "the first true 32-bit design."

Motorola called the 68020 "the most powerful microprocessing unit (MPU) available today, at least 2½ times more powerful than anything on the market." The device is measured at 2 to 3 million instructions per second (Mips) and is capable of burst rates exceeding 8 Mips.

The semiconductor supplier maintained that the 68020 is the "first complete 32-bit MPU available," despite the 32-bit chips built by AT&T, Intel Corp., National Semiconductor Corp. and other firms. "Others are simple data bus extensions of existing 16-bit processors, multichip sets, restricted function devices or stand-alone MPUs without the support of other compatible family processors or peripherals," according to Motorola.

The 68020 is said to be completely upward-compatible with user-object code for the earlier members of the 68000 family.

Integrating 200,000 transistors, the chip operates at 16.67 MHz. It provides direct linear access to 4G bytes of logical memory and fully supports virtual memory and virtual memory concepts.

Engineering samples have been sent to some manufacturers, while 100 additional customers will evaluate samples during third-quarter 1984, Motorola said. Most industry observers expect the first wave of commercial 68020-based systems to arrive early next year.

Motorola said it is also developing full 32-bit support chips, including a floating-point coprocessor and a paged memory management unit.

More information can be obtained from Motorola's Microprocessor Products Division, 3501 Ed Bluestein Blvd., Austin, Texas 78721.

INSIDE

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Storage/121

Printers/Plotters/121

Micro field's shakeout summer?



SMALL TALK
Eric Bender

Maybe the fabled microcomputer industry shakeout isn't here yet, but a lot of suppliers and resellers are dropping through the cracks.

Each week the crippled vendors hit the headlines: "Franklin Computer files for Chapter 11," "Eagle Computer is seeking a plan to pay certain debt."

Then there is the unending string of layoff announcements: Corvus Systems, Inc.; Visicorp; Software Arts, Inc.; Micropro International Corp.; Vector Graphic, Inc.; Gavilan Computer Corp.; Condor Computer Corp. . . .

On a less urgent note, some suppliers that have done well are scurrying for cash and cover, selling

themselves to larger companies, as in the case of Sorcim Corp.

Half a dozen large software distributors are pulling away from the crowd, and some experts predict that most others will dwindle away by year's end.

Discounting remains rampant, slicing away at the margins dealers need to stay in business. Many computer retailing franchise groups have cut back on plans.

And other stores, poorly capitalized or suffering from other problems, are closing their doors entirely.

But although growth has slowed, the overall market is still expanding. It will be years before all that desktop computing power reaches those who need it, and the possibilities for end-user software have not been touched.

And marketing executives at the big vendors say that we are not seeing a shakeout — not yet.

AT&T offers host of software for firm's supermicro, mini

NEW YORK — AT&T has announced software programs for its 3B2/300 supermicrocomputer and 3B5 minicomputer, both based on AT&T's 32-bit WE 32000 chip and running its Unix System V. The new programs offered, listed by vendor, include:

■ AT&T's Business Accounting System (a family of multiuser accounting systems, including accounts receivable, accounts payable, payroll, order and inventory and general ledger) will be available this month. Cost for the complete software system is \$5,000 for the 3B2 and \$10,000 for the 3B5. The packages also may be ordered separately.

AT&T's Gift Registry, an interactive data base designed to permit retail stores to track gift selections, will be offered in July. Price for either the 3B2 or 3B5 package is \$3,000.

The 3B2 version of AT&T's Ingres/Ingres-CS relational data base man-

agement system will cost \$2,000 and will be delivered in September. The 3B5 package will cost \$17,000; it will be available in August.

■ Ashton-Tate's Dbase II, offered this month, will cost \$1,200 in either version.

■ Handle Corp.'s family of office automation packages (Handle Writer/Spell, Handle Calc, Handle Graph and Handle List) will be delivered in October. Total package price is \$2,500 for the 3B2 and \$4,500 for the larger system. A combination of Writer/Spell and List will cost \$1,500 for the 3B2 and \$2,800 for the 3B5, while Calc and Graph together are priced at \$1,100 and \$1,900, respectively.

■ Microsoft Corp.'s Word is scheduled for October availability, priced at \$650 for the 3B2 version and \$1,300 for the 3B5 version.

The company's Multiplan spreadsheet is expected to be delivered in
See AT&T page 122

PRE-HISTORIC

SNA Gateway—The Missing Link In Micro To Mainframe Network Communications

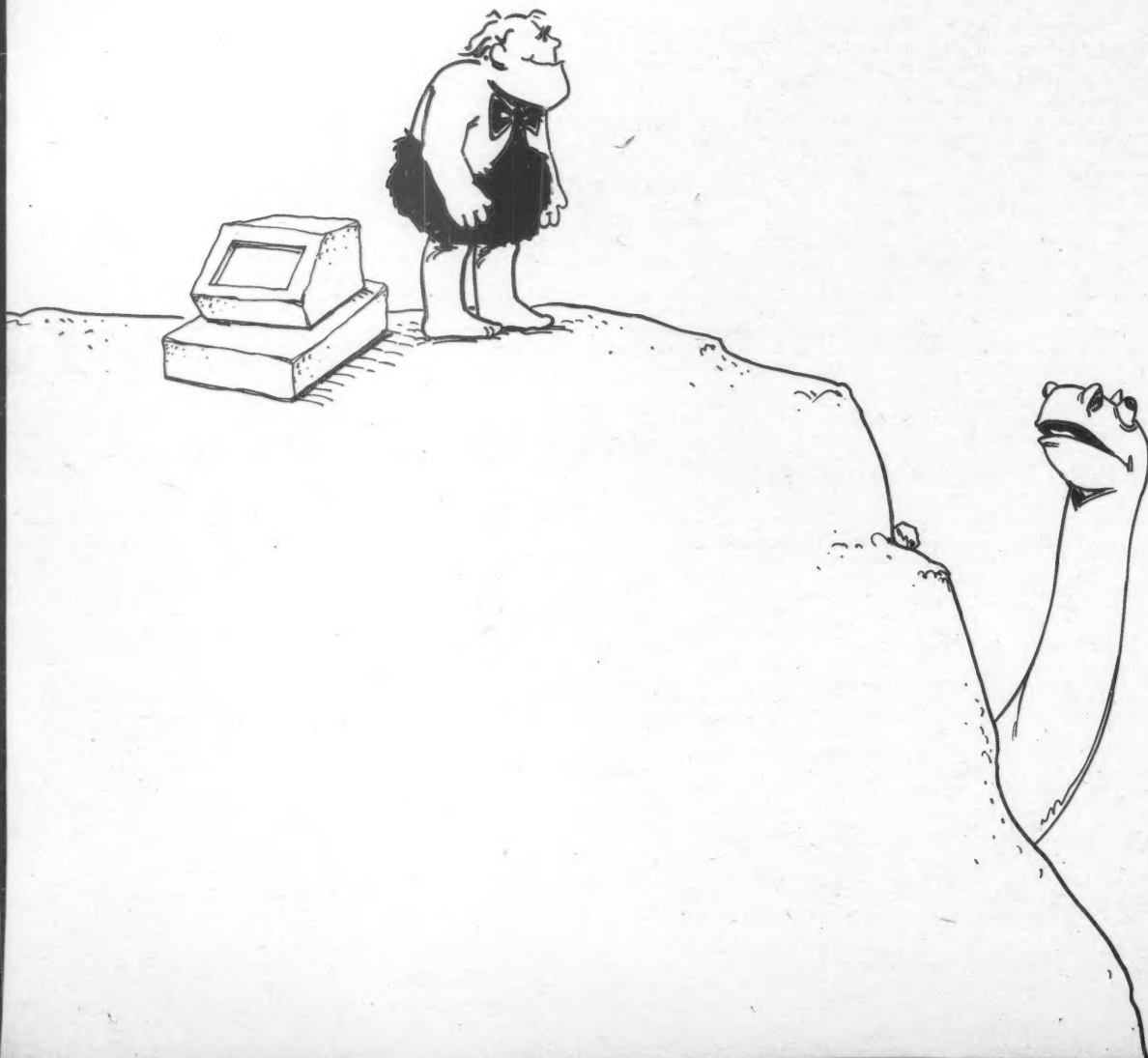
We all know micros are great. So are mainframes. But they seem to have evolved without any way to talk to each other.

Now, thanks to The Systems Center,

you can get your micros and mainframes communicating in a SNA environment over which you have complete control. And best of all, you'll use fewer resources and save money.

Welcome to a historic micro to mainframe solution. Welcome to the SNA Gateway. The first...the complete...the full SNA interface...the OMNINET-based, disk/printer sharing LAN...the 3270 emulating...the 'beyond 3270' intelligent workstation. The SNA Gateway.

The fittest...evolved to help you survive. By delivering full SNA compatibility. By letting you implement and adapt a variety of hardware and software products. And by buffering you from a rapidly changing environment.



The SNA Gateway connects your micros to your mainframe through an OMNINET LAN, the most widely used and cost effective network available. This is the only full SNA Gateway which attaches micros to mainframes via a local area network.

SNA Gateway hardware is a stand-alone 4.5" x 15" x 17" dual processor. The Systems Center's SNA software resides in the SNA Gateway hardware and in each micro workstation.

What the SNA Gateway delivers is the highest order of micro to mainframe connection, including program to program communications. And it works with no required changes to the host environment or applications. You even get a complete network diagnostic and trace capability.

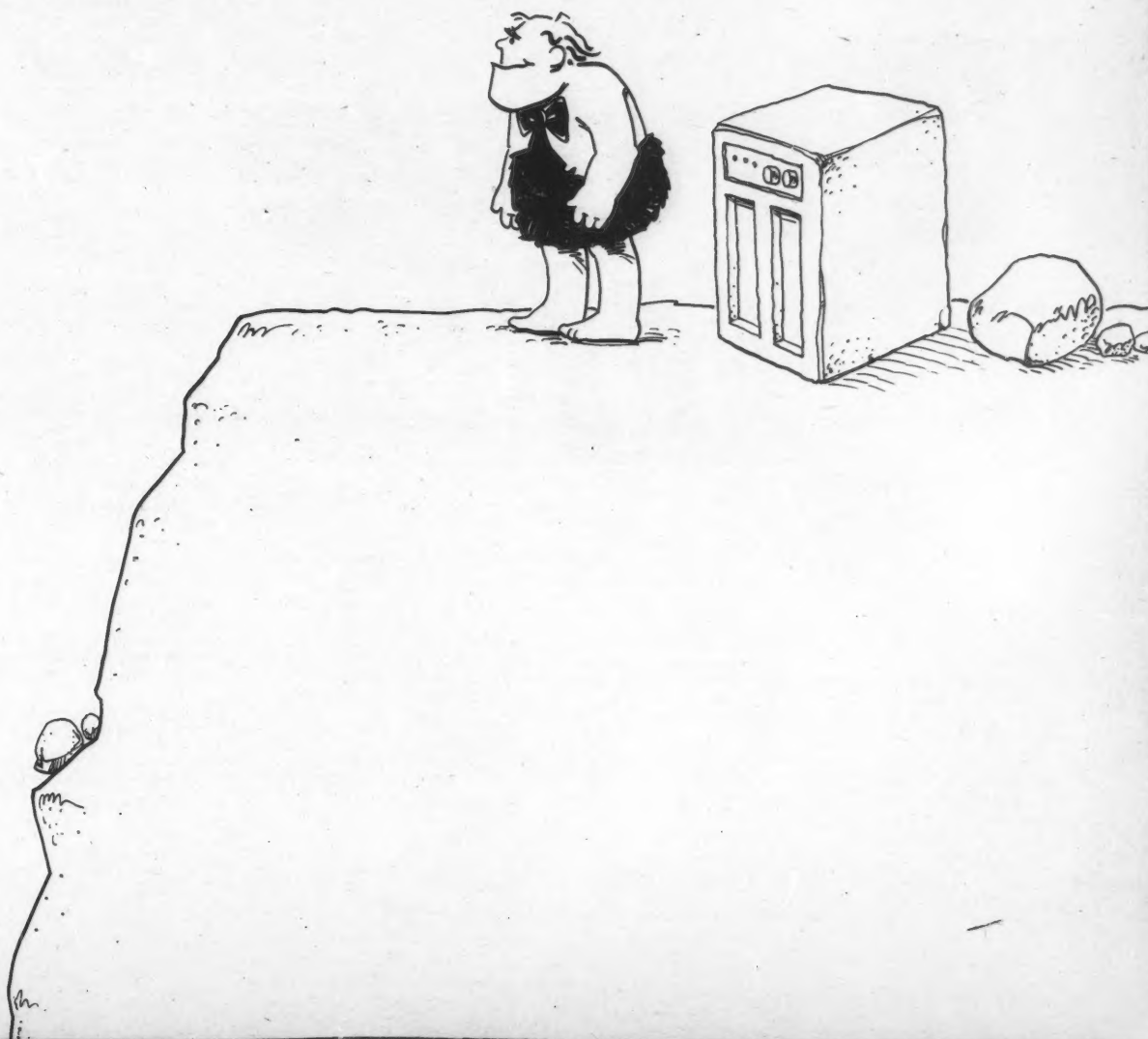
The SNA Gateway, when used with

The Systems Center's Network Data Mover products, also allows the unattended, automatic distribution of different file types like text, graphics, programs and mail bags. In fact, a combination of the SNA Gateway and NDM gives you the most powerful set of network management tools available.

So keep your present systems from going the way of the dinosaur. Start satisfying your micro users while maintaining complete control.

For more information, call The Systems Center at (800) 345-0611 outside California, and (415) 345-0611 if you're calling from inside California.

Or write 2988 Campus Drive, Suite 325, San Mateo, CA 94403.



MICROCOMPUTERS

Macintosh needs more software to compete with IBM: Sculley

By Robert Batt
CW West Coast Bureau

SAN FRANCISCO — A critical mass of new micro software applications must be developed if Apple Computer, Inc.'s Macintosh personal computer is to compete with the IBM Personal Computer in large corporations.

This candid assessment was delivered here last month by John Sculley, Apple's president and chief executive officer, who is largely responsible for guiding the company's Macintosh strategy.

"We believe the Macintosh will be successful in corporate America, but we must first earn our credibility, and we need to make sure the best

software that exists on the IBM [Personal Computer] also exists on the [Macintosh]," he said at Future Computing, Inc.'s "Macforum."

Sculley said much software for the Macintosh will be available within a year, but he warned that applications must go beyond those currently devised for the data processing industry.

"The personal computer industry is going to be a far more exciting business than merely a spin-off of what already exists in traditional computing. You cannot build a \$100 billion industry just on spreadsheets, word processing or even data bases," he said.

The applications environment, not

the operating system, will be the key to success for both Macintosh software developers and end users, Sculley asserted.

He claimed that Apple is "through the window of vulnerability" as far as the turmoil in the microcomputer industry is concerned, and he predicted a two-horse race between his company and IBM.

The issue of new applications was also brought up at the conference by James Johnson, president of Human Edge Software Corp., a Palo Alto, Calif.-based software firm that has developed products to run on the Macintosh.

Johnson blasted the microcomputer industry for a lack of innovation

and imagination. "The personal computer is a tool waiting for an application," he said. "Microcomputer users want new and different software applications."

"MIS managers, for example, want to be able to answer questions such as what tape drive to buy, rather than be confined to simply running word processing or data bases," he said.

The Macintosh provides a necessary, but not sufficient condition for the widespread use of computers, Johnson said. Software firms must now develop products that provide solutions to the everyday challenges facing management professionals, he maintained.

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*Tominy's completely portable application development system is presently available for IBM's PC, System/34, System/36, Series/1, 43XX, 30XX, 370xxx, DEC VAX/VMS systems, UNIX and XENIX operating systems.

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1-2-3 version for Model 2000 announced

FORT WORTH, Texas — Tandy Corp. has announced that Lotus Development Corp.'s 1-2-3 integrated software package runs on the TRS-80 Model 2000.

Since the Model 2000 uses an Intel Corp. 80186 microprocessor, Tandy claimed that the Model 2000 version of 1-2-3 runs two to six times faster than an IBM Personal Computer version. A spokesman said that for the first time color can be used in text mode with its version of 1-2-3, and data files created with the IBM Personal Computer or other machines running 1-2-3 can be loaded into the Model 2000.

The Model 2000 version of 1-2-3 is priced at \$495 and includes Microsoft Corp.'s MS-DOS operating system, a spokesman said.

More information is available from Tandy, located at 1800 One Tandy Center, Fort Worth, Texas 76102.

Kaypro 2X touts added storage

SOLANA BEACH, Calif. — Kaypro Corp. has introduced an enhanced version of its Kaypro 2 computer, the Kaypro 2X.

The Kaypro 2X will feature two double-sided, dual-density disk drives that reportedly will offer twice the Kaypro 2's storage capacity and will carry a \$5 price tag, \$300 greater than the cost for the earlier model.

The Kaypro 2X reportedly will also feature 64K bytes of random-access memory, a built-in, 9-in. monitor, a detachable keyboard and more than \$3,000 worth of software, including Micropro International Corp.'s Wordstar and Digital Research, Inc.'s CP/M operating system.

Additional information on the Kaypro 2X version is available from Kaypro, which is located at 533 Stevens Ave., Solana Beach, Calif. 92075.

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Motorola/Four-Phase introduces The 6000 Series—a new milestone.

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Motorola/Four-Phase systems are tough enough and smart enough to deal with the real world—where speed, power, and reliability in a multi-user environment are prime considerations. The new 6000 systems feature the high-performance 32-bit Motorola 68010 CPU and an operating system derived from UNIX* System V under license from AT&T. We created





integrated system software that combines these two industry standards into a powerful, multi-user, multi-tasking environment that can stand up to practically any application.

There are two systems in the 6000 family. The 6300 supports 1-8 users, making it perfect for the smaller user or a remote office. The 6600 is a high-performance system designed to support up to 128 users. Both systems offer complete and integrated solutions—whether they're working in an operations-oriented environment where efficiency and precision are needed, or a results-oriented environment where flexibility and quality are key.

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At Motorola/Four-Phase, our commitment to you goes beyond providing quality, high-performance hardware and software. Support is just as important. Our award-winning Customer Support Operation is staffed with over 1,400 customer support specialists in over 175 cities across the nation. One phone call to our


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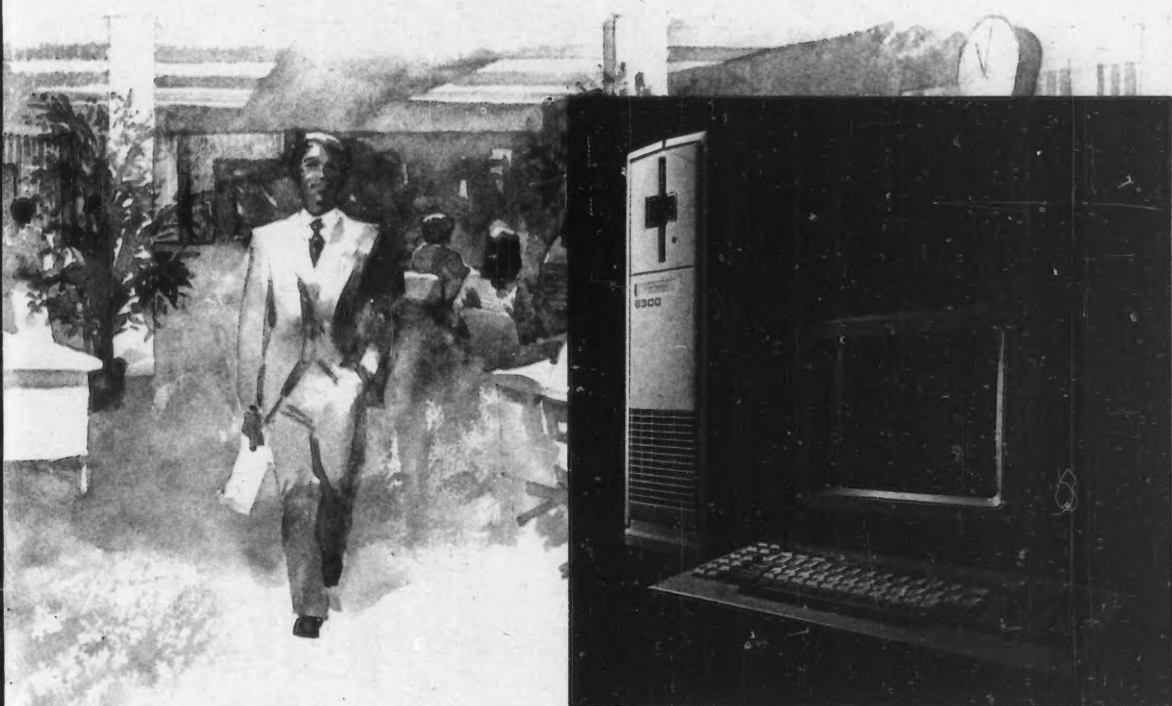
If you're a DP/MIS manager or OEM, find out what the latest milestone in office systems can mean to you. Contact Motorola/Four-Phase today at 1-800-528-6050, ext. 1599. In Arizona, call 1-800-352-0458, ext. 1599. Or write us at 10700 North De Anza Blvd., M/S 52-3B1, Dept. S., Cupertino, CA 95014.



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1984

Motorola/Four-Phase announces The 6000 Series—a milestone in productivity that delivers information processing performance today, and expansion capabilities for tomorrow.

Zilog now gives users of the System 8000 the kind of choice the big three cereal companies have given breakfast eaters for years.



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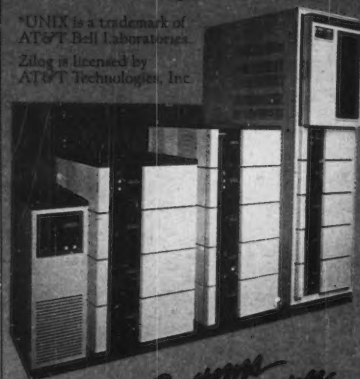
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Publications, 1315 Dell Avenue, MS C2-6, Campbell, CA 95008.

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MICROCOMPUTERS

SOFTWARE

JMI SOFTWARE CONSULTANTS, INC.**Bastoc enhancement**

JMI Software Consultants, Inc. has enhanced Bastoc, a software tool that translates Basic programs to formatted C source code.

The enhanced package reportedly will add C Basic compiler dialect support to existing support of Microsoft Corp.'s Basic. Bastoc reportedly can serve as a conventional Basic compiler when configured as a preprocessor to a C compiler. Bastoc may be tailored by the end user, who can add new Basic statements and functions, JMI said.

Bastoc is available for a number of computers, including the IBM Personal Computer; Wang Laboratories, Inc. Professional Computer; Radio Shack's Model 16; and Apple Computer, Inc.'s Lisa.

Bastoc costs \$350.

JMI Software Consultants, 1422 Easton Road, Roslyn, Pa. 19001.

MODTECH INTERNATIONAL, INC.**Lois Workstation Integrator**

Modtech International, Inc. has introduced its Lois Workstation Integrator, which reportedly lets popular software applications work together on the IBM Personal Computer and compatible systems.

Lois, from Lytron Systems, Inc. reportedly allows users to operate integrated software without giving up familiar applications. The Lois Workstation Integrator is a preconfigured version of Lois said to extend these advantages to users of popular applications such as Lotus Development Corp.'s 1-2-3, Ashton-Tate's Dbase II and Microsoft Corp.'s Multiplan. Users need only identify the applications present on a system from an on-screen list of all applications covered, the vendor said.

Lois also reportedly offers a routing facility that allows users to extract selected information from one application and insert it into another, performing any needed file format conversions automatically on the way, Modtech said.

Minimum system requirements are said to be 256K bytes of random-access memory, Microsoft's MS-DOS 2.0 and a hard disk storage unit.

Lois Workstation Integrator is priced at \$295.

Modtech International, 5250 S. Green St., Salt Lake City, Utah 84123.

BOEING COMPUTER SERVICES**Datamanager; Scholar/Teach 3R**

Boeing Computer Services has announced the availability of the Datamanager data entry system and the Scholar/Teach 3R computer-based instruction course.

Datamanager is said to provide up to 64 separate edits for data validity, restructuring of data according to the format required and full preview of data prior to transmission to the host. The software runs under Microsoft Corp.'s MS-DOS on the IBM Personal Computer and Personal Computer XT, the vendor said.

Typical applications of Datamanager include order entry, insurance claim filing and similar data collection activities, Boeing said. Features

reportedly include sophisticated screens and customized error messages. The complete system, including the screen design model, is priced at \$700 per copy, while the data collection capability is priced at \$450.

The spreadsheet and data base courses are each one hour in length and are priced at \$60 each, the vendor said. The three-hour computer terminology course is priced at \$85.

Boeing Computer Services, 7980 Gallows Court, Vienna, Va. 22180.

DIGITAL SIGNATURE**Crypt Master/16, Crypt Master/24**

Digital Signature has announced two data security programs for the IBM Personal Computer, Crypt Master/16 and Crypt Master/24, both implementations of the Rivest-Shamir-Ableman (RSA) public-key

cryptosystem.

With the system, a 360K-byte disk may be encrypted or decrypted in seven minutes, according to the vendor.

Crypt Master/24 employs a modulus of 384 bits (117 decimal digits), the vendor said.

Crypt Master/16 employs a modulus of 256 bits (77 decimal digits).

According to the vendor, Crypt Master/16 is nearly twice as fast as Crypt Master/24 and approximately six times faster than other commercially available RSA implementations.

The price for Crypt Master/16 is \$295, and the price for Crypt Master/24 is \$545, according to a vendor spokesman.

Digital Signature, 5453 S. Woodlawn, Chicago, Ill. 60615.

See **TOOLS** page 116

AT&T micro to offer Windows

BELLEVUE, Wash. — AT&T Information Systems, has signed an agreement to offer Microsoft Corp.'s Windows on the new AT&T Personal Computer, Microsoft announced here late last month.

Windows, announced in November 1983, is "an extension to the MS-DOS operating system which provides a universal standard operating environment for the new generation of bit-mapped applications programs," according to Microsoft.

The development version of Windows was released to OEMs and software vendors in May, according to Microsoft.

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MICROCOMPUTERS

TOOLS from page 115

KDM INFORMATION SYSTEMS, INC.
Cobref

KDM Information Systems, Inc. has introduced Cobref, a Cobol cross-reference compiler for use with Convergent Technologies, Inc. systems running under Convergent's Ctos operating system.

Cobref reportedly can be used in conjunction with the Ctos Cobol compiler to aid programming. At the end of a compile, it is said to generate a cross-reference listing automatically, saving debugging time.

Under Cobref, the output file reportedly can be directed to the screen, printer or spooled file on a disk. The source program, mean-

while, reportedly can reside on any floppy or hard disk.

Cobref is priced at \$165.

KDM Information Systems, 108 College Park Plaza, Johnstown, Pa. 15904.

THE SOFTWARE GROUP
Enable

The Software Group has introduced Enable, a five-application integrated package designed for an IBM Personal Computer with IBM's PC-DOS operating system.

Enable's five applications consist of word processing, spreadsheet, graphics, telecommunications and data base management.

Enable costs \$695 and requires 192K bytes of random-access memory to function.

The Software Group, Northway 10

Executive Park, Ballston Lake, N.Y. 12019.

BELLESOFT, INC.
ESP

Bellesoft, Inc. has announced Entry System for Programs (ESP), a language-oriented editor for IBM Personal Computer Pascal and C users said to allow novice programmers to learn the two languages more quickly and to permit experienced programmers to learn more efficiently.

ESP is said to give the user access to a text editor as well as the Pascal and C program formats. ESP also is said to guide the programmer through various levels of available programming options.

Features of the ESP text editor, the company said, include direct cursor positioning, range, page and file

positioning, scrolling, delete, insert, join and overwrite capabilities. Another feature is split-screen editing, in which up to five windows may be viewed, edited and saved at a time.

ESP is available for the IBM Personal Computer, Personal Computer XT and compatibles, according to the vendor. The system must have at least 192K bytes of random-access memory, an 80-col. display, one disk drive and the IBM PC-DOS or Microsoft Corp. MS-DOS operating systems.

The ESP is priced at \$249 for the Pascal package, \$349 for C and \$399 for both, the vendor said. The package includes a 300-page manual and plastic keyboard template.

Bellesoft, 2820 Northup Way, Bellevue, Wash. 98004.

OFFICE SOLUTIONS, INC.
Officewriter Version 3.0

Office Solutions, Inc. has enhanced Officewriter, a word processing package that runs on the IBM Personal Computer XT.

New capabilities include "boilerplate" text capability, support for scientific and foreign characters, undo capability, menu bypass from edit to print, on-screen underlining and on-screen boldface, Office Solutions said. The new release is said to change search and replace functions so that they incorporate case sensitivity and retain the last value used.

Officewriter reportedly supports 30 printers and has multiple col. print, overstriking, 15-pitch and 1/4-line spacing capabilities.

The word processing package costs \$325.

Office Solutions, 5708 Odana Road, Madison, Wis. 53719.

DATAMATE CO.
RM/Cobol compiler for HP 150

Datamate Co. has adapted Ryan-McFarland Corp.'s RM/Cobol compiler to the Hewlett-Packard Co. HP 150 personal computer.

The version of the RM/Cobol compiler enables software developers to utilize the HP 150's touch-screen functions without writing assembly-level routines, the vendor said. The product is designed to help systems houses, sites using networks of HP 150s built around HP 3000 minicomputers, and other businesses in developing software for the HP 150.

The program is priced at \$950, including the compiler, touch-screen interface and one Cobol runtime interpreter. Additional runtimes cost \$250 each.

Datamate, Suite 128, 4135 S. 100 E. Ave., Tulsa, Okla. 74146.

MICRO BUSINESS APPLICATIONS, INC.
PhD

Micro Business Applications, Inc. has announced its PhD relational data base management system, said to integrate with the firm's accounting applications.

PhD reportedly is provided with predefined views of the firm's major accounting files, allowing users to have immediate access to accounting data. Users reportedly can describe views of the files' information by drawing forms on the screen and relating separate files by name.

PhD is also said to offer calculating totals, subtotals and averages

Continued on page 118

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ware pioneer Gordon Eubanks is featured in Part 2, with an overview of the data base software available for micro computer users. Part 3 takes a look at Lotus Development's success with 1-2-3™ the product that caught the market by storm. And finally in Part 4, experts discuss communications as the most powerful PC application.

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MICROCOMPUTERS

Continued from page 116

from information in the files and to allow management to view and report all information in the integrated system in any manner of predefined accounting formats.

PhD is priced at \$495 and runs on the IBM Personal Computer, Personal Computer XT, the Digital Equipment Corp. Rainbow and Decmate and other popular personal computers.

Micro Business Applications, 12281 Nicollet Ave. S., Minneapolis, Minn. 55337.

BROCK SOFTWARE PRODUCTS, INC.

Keystroke Data Base and Report Generator for Lisa

Brock Software Products, Inc. announced a new version of their Keystroke software, which runs on Apple Computer, Inc.'s Lisa desktop computer. The program takes advantage of Lisa's mouse, so that commands can be executed by pointing and clicking the device.

Keystroke Data Base and Report Generator for Lisa functions as an electronic filing cabinet, permitting users to store, find, update and print information. Input forms can be designed on screen just like on paper, the vendor said.

Features of Keystroke are said to include a Find/Update function to permit users to find and recall stored information, a Cross-Reference feature to allow entering an additional file to the file being worked on without rekeying and a Report Generator to translate input into rows and columns.

Running the Keystroke system requires 1M byte random-access memory, a hard disk drive and Apple's Lisa Office System or Workshop. The retail price is \$595.

Brock Software Products, P.O. Box 799, Crystal Lake, Ill. 60014.

ARTHUR ANDERSON & CO.

Design/1

Arthur Anderson & Co. has announced Design/1, a software systems design package for the IBM Personal Computer that aids system development and medium and large computer project implementation.

The package includes local-area network software and runs on the IBM Personal Computer. In conjunction with design methodologies such as Arthur Anderson's Method/1, the product reportedly provides graphics and text editing that automates documentation of all design work.

Design/1 requires 512K bytes of random-access memory and IBM PC-DOS 2.1 operating system.

The first copy of the program costs \$15,000; additional copies can be purchased for \$1,000 each.

Arthur Anderson, 69 W. Washington St., Chicago, Ill. 60602.

DYNABYTE BUSINESS COMPUTERS

Concurrent CP/M

Dynabyte Business Computers has announced that Digital Research, Inc.'s Concurrent CP/M 86 operating system now runs on Dynabyte's Monarch microcomputer line.

The operating system features virtual console, print spooling and communications capability.

The Monarch line is a series of multiuser microcomputers that feature Zilog, Inc. Z80 and Intel Corp.

8086 microprocessors, 256K bytes of random-access memory (expandable to 1M byte), and 20M to 92M bytes of hard disk storage, according to the vendor. The line also supports Digital Research's CP/M and MP/M-II; Phase One Systems, Inc.'s Oasis; and Science Management Corp.'s Thoroughbred.

The operating system costs \$695. *Dynabyte Business Computers, 521 Cottonwood Drive, Milpitas, Calif. 95035.*

MICRO-MRP, INC.

Max, the Production Manager

Micro-MRP, Inc. has introduced Max, the Production Manager, a manufacturing industry interplant system, designed for an IBM Personal Computer with IBM's PC-DOS.

The product reportedly lets multi-site corporations coordinate production among various facilities. The product allows a destination plant and a source plant to work out a production schedule for fulfilling orders, Micro-MRP said.

In operation, the destination plant transmits to the source plant a request for product quantity and due dates, the vendor said. The source plant attempts to create a schedule to meet those dates. If it cannot accomplish this, it sends an alternative request which the destination plant can accept or reject, according to Micro-MRP.

Max costs \$20,000. *Micro-MRP, 1065 E. Hillsdale Blvd., Foster City, Calif. 94404.*

SOLVATION, INC.

PC/7000 enhancements

Solvation, Inc. has announced several enhancements to its 7000 multiuser microcomputer system, including a software link that reportedly permits the use of one or more IBM Personal Computers as general-purpose workstations to the 7000.

With PC Link software, files can be transferred between the 7000 and the IBM Personal Computer in both directions and when modems are attached to the Personal Computer and the 7000, the Personal Computer may act as a remote terminal at 300 to 9,600 bit/sec, a spokeswoman said.

The vendor also announced a 40M-byte disk drive option, doubling the storage capability of the existing 7000 and permitting its expansion from five to 12 users, the spokeswoman said.

Product prices are: PC Link software, \$295; 7000 Link Software, \$295; PC/7000 link cable, \$150; and 40M-byte disk drive, \$2,500.

Solvation, 150 Flanders Road, Westboro, Mass. 01581.

GRAPHIC COMMUNICATIONS, INC.

Graphwriter enhancement

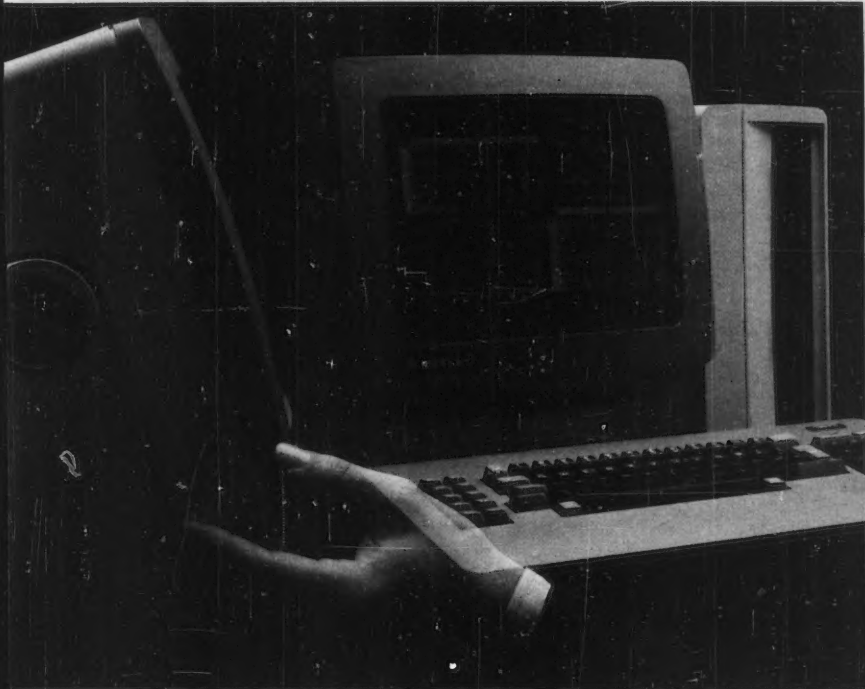
Graphic Communications, Inc. has added batch processing capability to its Graphwriter, a graphics package for personal computers.

Batch processing is said to allow Graphwriter users to produce one or more charts in succession with or without operator assistance. It reportedly can be used with various output devices, including printers, plotters and 35mm color film recorders.

Batch processing also is said to permit a graphics user to create pre-

Continued on page 120

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Tilt Screen	YES	NO	YES	NO
Quiet Operation	YES (NO FAN)	NO	YES	NO
Memory	128K	128K OPTION	256K	256K OPTION
Graphics Display	YES	OPTIONAL	YES	OPTIONAL
(640 x 200 resolution)				
Printer Port	YES	OPTIONAL	YES	OPTIONAL
Communications Port	YES	OPTIONAL	YES	YES
MS®DOS/BASIC®	YES	OPTIONAL	YES	OPTIONAL
System Expansion Slot	YES	YES	YES	YES
RGB and Video Port	YES	OPTIONAL	YES	OPTIONAL

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Printer Port	Yes	Optional
MS®DOS 2.11	Yes	Optional

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MICROCOMPUTERS

Continued from page 118

sentation materials at a personal computer with or without an output device attached and to allow groups to economize by sharing an output device.

Batch processing capability is currently available on Graphwriter for the IBM Personal Computer, Personal Computer XT, compatible systems and the Digital Equipment Corp. Rainbow. It is priced at \$595.

Graphic Communications, 200 Fifth Ave., Waltham, Mass. 02254.

INSTITUTE FOR SCIENTIFIC ANALYSIS, INC.

Version 2.3 of Super

The Institute for Scientific Analysis, Inc. has released Version 2.3 of its Super menu-driven data base system.

Enhancements are said to include on-screen editing capability and the ability to store report formats. The firm also reportedly revised Super's manual to apply to specific personal computer models.

Super is available for Radio Shack's TRS-80 Models I, II and III; Wang Laboratories, Inc.'s Personal Computer; the IBM Personal Computer; and machines running under the Digital Research, Inc. CP/M operating system.

Super is priced at \$199.

Institute for Scientific Analysis, 36 E. Baltimore Pike, Media, Pa. 19063.

SYSTEMS

BOEING COMPUTER SERVICES CO.

Business Management Workstation

Boeing Computer Services Co. has announced the Business Management Workstation, said to provide a full extension of its mainframe-based EIS decision support system (DSS), with graphic interface to the IBM Personal Computer XT/370.

The workstation is part of Boeing's Mainstream Distributed Services, said to allow DSS users to take advantage of the capabilities of mainframes and micros while running in a compatible environment.

The Business Management Workstation is available in three configurations. The first includes an IBM Personal Computer XT/370 with two 10M-byte fixed disks, one 360K-byte diskette drive, a monochrome monitor, a color display monitor, a graphics printer and software. Package price is \$21,000, the vendor said.

The second configuration excludes the display and printer hardware and will cost \$19,000. The third configuration upgrades an existing XT to XT/370 for a price of \$11,000, the vendor said. The workstation will be available in third-quarter 1984, according to Boeing.

Boeing Computer Services, 7980 Gallows Court, Vienna, Va. 22180.

CASCADE GRAPHICS DEVELOPMENT

Cash/CAD X

Cascade Graphics Development has announced the voice-operated Cash (Computer-Aided System for the Handicapped)/CAD X, said to have all the features of the Cascade X dual-raster monitor system with a 19-in. high-resolution (1,024 pixel by

798 pixel) screen.

The Cash/CAD X is able to develop a drawing by voice alone, using extensive vocabulary commands, the company said. The product is available for Apple Computer, Inc. microcomputers, according to the company.

The Cascade X system is based on a Motorola, Inc. 68000 microprocessor, backed by 1M byte of random-access memory. A standard 5M-byte hard disk can be expanded up to 80M bytes.

Optional plotters that can handle A-size to E-size drawings are available, as is a 150 char./sec printer.

The Cash/CAD X is priced at approximately \$35,000, the vendor said.

Cascade Graphics Development, 1000 S. Grand Ave., Santa Ana, Calif. 92705.

CONTROL DATA CORP.

Designpro II

Control Data Corp. has announced an enhanced version of its CDC/Personal Computer-Aided Design (CDC/PCAD) personal computer-based electronics design system and software, now called Designpro II.

Designpro II is said to include new set commands to facilitate storing and editing of schematics, automatic arc and circle generation to improve design quality and a user-definable grid to help the designer judge scale and spacing on the schematic.

A fully configured Designpro II system includes an IBM Personal Computer XT-compatible microcomputer; software for schematic entry, documentation project management and netlist extraction to several design software packages; a dot matrix

printer/plotter; a 10M-byte Winchester hard disk drive; a 360K-byte floppy disk drive; and a mouse.

Users with an IBM Personal Computer, Personal Computer XT and certain compatibles can purchase a package of add-ons, software, utilities package and mouse for \$7,825 to provide personal electronic design applications, the vendor said.

The Designpro II is priced at \$15,825, the vendor said.

Control Data, 8100 34th Ave. S., Minneapolis, Minn. 55440.

COMPUPRO CORP.

System 816 enhancements

Compupro Corp. has greatly expanded its System 816 line of single-user and multiuser computers, increasing the number of configurations from seven to 35.

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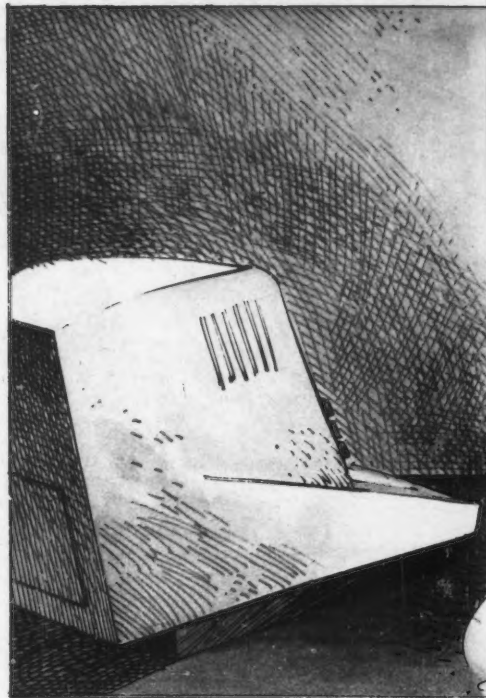
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Very simply—and with blazing speed—Friday! handles just about everything that needs handling around the office.

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And wait until you see the way it handles mailing lists and labels—it's worth the \$295 (suggested retail) price for that alone!

MICROCOMPUTERS

Compupro's System 816 line is based on Intel Corp.'s 8088, 8086, 8087, 80286 and 80287; Motorola, Inc.'s 68000; and Zilog, Inc.'s Z80 microprocessors. Standard features include 64K bytes of random-access memory (RAM) (expandable to 16M bytes), 2.4M bytes of 8-in. floppy disk storage, four to 12 serial ports, one printer port and one parallel port, Compupro said. The systems support Digital Research, Inc.'s CP/M 8-16, Concurrent DOS 8-16, CP/M 86 and MP/M 86 operating systems.

Compupro has added 20M-, 40M- and 80M-byte hard disk capability to all models except the 816/F and introduced two new base models, 816/DD and 816/EE.

The 816/DD reportedly features an Intel 8086 microprocessor, 512K bytes of RAM (expandable to 1M byte), two 8-in. floppy disk drives,

four serial ports, a printer port and one parallel port. Prices for the 816/DD range from \$7,995 to \$13,995.

The 816/EE includes a Motorola Inc. MC68000 microprocessor, 256K bytes of RAM (expandable to 16M bytes), two 8-in. floppy disk drives, four serial ports, Digital Research's CP/M 68K-byte operating system, one printer port and a parallel port. Its price range is \$6,495 to \$12,995, the vendor said.

Compupro, 3506 Breakwater Court, Hayward, Calif. 94545.

COMMUNICATIONS

UNIQUE AUTOMATION PRODUCTS, INC.
UAP-Link enhancement

Unique Automation Products, Inc. has enhanced UAP-Link, a terminal emulation and file transfer package for the IBM Personal Computer.

The enhancement reportedly emulates Digital Equipment Corp.'s VT100 terminal.

According to UAP, the enhancement also allows the user to switch between emulator and file transfer modes.

The package reportedly features free-format text file transfer, startup command files and an on-line Help facility.

With a mainframe version of UAP-Link, users can transfer error-free binary and text files with data compression, correct formatting and automatic sessions, according to the vendor.

UAP-Link for the IBM Personal Computer costs \$325.

Unique Automation Products, Suite G, 15401 Redhill Ave., Tustin, Calif. 92680.

STORAGE

CALLAN DATA SYSTEMS, INC.
Peripherals Expansion Module

Callan Data Systems, Inc. has announced a mass-storage expansion unit that reportedly triples disk performance of the Callan Unistar 300 supermicrocomputer. The Peripherals Expansion Module features nine-track streaming tape and incremental backup modes.

At maximum configuration, the module houses a nine-track tape unit, supporting 10-in. reels of 1/2-in. tape at 1,600 bit/in., and a 474M-byte unformatted Winchester disk drive with 17 msec of average access speed, according to Callan.

When several Unistar 300s are set up in a network, the Peripheral Expansion Module reportedly can function as a file server and backup server.

The 9-track tape unit configuration is priced at \$9,950. The 474M-byte Winchester unit configuration retails at \$27,450, and the 9-track tape/474M-byte disk configuration sells for \$34,950.

Callan Data Systems, 2637 Townsgate Road, Westlake Village, Calif. 91361.

PRINTERS/PLOTTERS/PERIPHERALS

AMDEK CORP.
Color 600

Amdek Corp. has announced a red/green/blue video input monitor designed for text and graphics applications on IBM and Apple Computer, Inc. personal computers.

The Amdek Color 600 is targeted to the business/corporate environment, sophisticated end users and the secondary and upper education marketplace, the vendor said.

It reportedly features 640-dot by 240-line resolution and a black matrix CRT.

Scheduled for delivery by August 1, it costs \$650.

Amdek, 2201 Lively Blvd., Elk Grove Village, Ill. 60007.

EAGLE COMPUTER, INC.
Monitor; graphics board

Eagle Computer has introduced a monitor and a graphics display board for its IBM Personal Computer-compatible machines.

The 13-in. monitor, running with the graphics board, reportedly provides 80 characters by 25 rows in text mode and color graphics with up to 16 background colors.

The color monitor's suggested retail price is \$680. The color/graphics adapter board is priced at \$295, the vendor said.

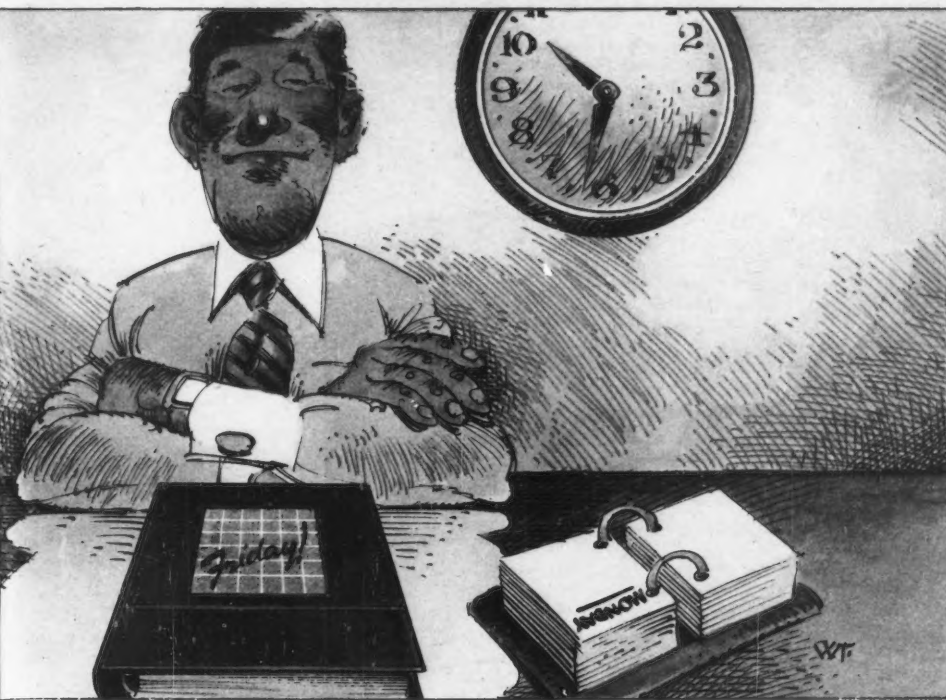
Eagle Computer, 983 University Ave., Los Gatos, Calif. 95030.

WANG LABORATORIES, INC.
PC-PM014

Wang Laboratories, Inc. has announced the Model PC-PM014 letter-quality daisy printer, an addition to

Continued on page 122

done by Friday!



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1-TM Lotus Corp. 2-TM Micropro. 3-Registered TM Digital Research.
4-TM IBM Corp. 5-TM Microsoft.

MICROCOMPUTERS

Continued from page 121
its Professional Computer peripherals family.

The bidirectional PC-PM014 is said to provide 10, 12 and 15 pitch at 50 to 55 char./sec. It has a mean time between failure rate of 3,000 hours at 25% duty cycle.

The PC-PM014 is said to support the Wang library of metal and plastic printwheels and accommodate paper widths of 3 1/4 in. to 15 in. and six-part forms.

The unit measures 9 in.

high, 18 in. deep and 24 in. wide and weighs approximately 63 lbs, the vendor said.

Failures on the PC-PM014 are reported on a digital display, and additional diagnostics can be activated by selecting a test button on the control panel.

The PC-PM014 is priced at \$2,995, with a monthly maintenance fee of \$43.

Wang Laboratories, One Industrial Ave., Lowell, Mass. 01851.

DESK from page 107

new top-of-the-line Compaq Deskpro Model 4, did represent a key buying feature for this user. "We are currently using floppy disks to back up our hard disk system," the manager said. "A machine with a built-in tape backup system may represent an attractive alternative."

The introduction of the desktop line marks a significant turning point for Compaq, the analysts suggested.

"So far, its success has been predicated on a good product, aggressiveness in getting into the retail channel, unavailability of the IBM Personal Computer, attractive features and pricing," Meserve claimed. "The price advantage is gone, at least for the moment."

Compaq's portable computers have moved swiftly from retailer shelves into large corporations, but more aggressive pricing will be required if the micro vendor is

to maintain market share, according to analysts.

"To keep their installed base, the company has to aggressively price its product," Fleming said. "They have to offer substantial discounts to volume purchasers. There is a lot of competition from other compatible manufacturers."

Cutting prices, however, may mean Compaq cuts its own throat, Fleming said. "IBM could cut the price of their machines more, and Compaq could not afford to do that," Fleming claimed. "They could be out of the competition after one more price cut."

Compaq will have another difficulty selling to large corporations, Fleming predicted. "The market is looking to integrate personal computers into larger systems," Fleming said. "AT&T should do well because it sells larger systems. Compaq does not have a larger system. It is looking for bottom-up integration, and that will be hard to accomplish."

Despite these obstacles, Meserve thinks Compaq has a good chance of making it. "Of all the clone manufacturers, they are the most solid," Meserve noted. "They have good management and are well financed."

AT&T from page 107

September, costing \$500 for the 3B2 and \$1,000 for the 3B5.

■ **Relational Database Systems, Inc.'s C-Isam**, a library of C language functions that create and manipulate indexed file systems, will be available in September. Price for the 3B2 version is \$450, while the 3B5 package will cost \$900.

Relational's Informix database management system will be offered in August, priced at \$1,600 for the 3B2 and \$3,000 for the 3B5. The company's File-it! file manager is scheduled for September delivery. Cost is \$495 for the 3B2 and \$895 for the 3B5.

■ **Ryan-McFarland Corp.'s RM Cobol** will be sold in August. The 3B2 version will cost \$1,500, while a runtime package will be priced at \$300. The 3B5 package will sell for \$3,000, with a runtime package available for \$600.

For more information, contact AT&T at One Speedwell Ave., Morristown, N.J. 07960.

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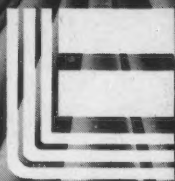
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COMPUTER INDUSTRY

GE, union agree on automated plant in Mass.

By David Olmos
CW Staff

LYNN, Mass. — General Electric Co. recently gave its 8,300 unionized workers here a choice: Accept automation, and the company will invest many millions of dollars to modernize local factories; reject it, and the company will take those dollars elsewhere.

Few people were surprised when the union's rank-and-file voted by a wide margin to endorse a negotiated agreement to build a \$52 million "factory of the future" in this industrial city just north of Boston.

"Automation is a little bit scary," said John Murphy, business agent for Local 201 of the International Union of Electrical Workers. "But I think it would be a helluva lot scarier if GE had never come and spoken to us about this and decided to build [the new plant] in Puerto Rico or Mexico and pay people \$3.50 an hour to work there."

Company officials said the agreement,



Site for GE's "factory of the future."

which requires the bending of some traditional rules, signifies a major step forward for labor-management plant relations.

"This vote is kind of symbolic for the acceptance of advanced technology and accelerated change in this manufacturing business," asserted James Krebs, vice-president and general manager of GE's Aircraft Engine Business Group here. "This is one of the first attempts at building a brand new, state-of-the-art plant in a big, old location."

The GE group, which builds jet engines primarily for military aircraft, also operates factories in nearby Everett, Medford and Wilmington, Mass.

See **UNION** page 137

Wang developing toehold in common carrier business

By John Dix
CW Staff

DENVER — Wang Laboratories, Inc. has been quietly testing the waters of the communications carrier business for the last year.

The maker of small business and office processors established Wang Communications, Inc., a wholly owned subsidiary, a little over a year ago. Based here, the fledgling common carrier markets private-line services.

While Wang Communications currently offers facilities in only one state, Courtney Wang, son of Dr. An Wang and general manager of the company, said plans call for the development of a "fairly extensive and comprehensive network" by establishing local links that will initially be interconnected via MCI Communications Corp. services.

The first part of that network is a digital microwave link in Massachusetts that the company runs from the top of the Prudential tower in Boston north to the top of Wang Labs tower in Lowell, near the Massachusetts-New Hampshire border. Private-line subscribers of Wang Communications are using the network for voice communications, but a "good portion" of the system's capacity is used by the parent company, Wang Labs, for internal communications among its Massachusetts facilities, Wang said.

Go where competition is not

By the end of the year, Wang Communications will extend that microwave link into New Hampshire and possibly start similar systems elsewhere in the country. "This is a very competitive field, and part of our strategy is to go where there is not a whole lot of competition, but where there is a requirement for circuits that is not being fulfilled by the local telephone company," Wang said.

The company is conducting market studies in three other parts of the country. "This is a very capital-intensive business, so we are really looking at the various geographic marketplaces that need a service

See **WANG** page 136



The federal tax R&D credit expires at the end of 1985 and prospects to extend it are slim, following a failed effort to write a permanent credit into the recently completed 1984 tax bill/130

■ A venture capitalist's guide to convincing investors to put up the money for turning new ideas into new products/127

■ Now is not the time to implement international guidelines on transborder data flows, a conference in Rome was told recently/128

■ The acquisition of Electronic Data Systems Corp. by General Motors Corp. provides potential tangible benefits to each/133

Time (and PR) heal all media doubts



INDUSTRY INSIGHT

Peter Bartolik
CW Senior Editor

Who said you can't teach an old dog new tricks?

Some of us journalist hacks were just about ready to write the obituaries on creative public relations. We had figured the new public relation types were all cast in the mold of the corporate bureaucrat — those who believe the print media should be the last to know.

But the dynamic computer industry has come up with a new twist on managing public opinion.

It's called the "Exclusive." AT&T, a

newcomer to the microcomputer market, pulled off what may be one of the greatest PR scoops of this or recent years. Not only that, but *Personal Computing* magazine was left feeling confident that it had pulled off the greatest media coup of the year by producing a special 36-page section on a microcomputer product announcement.

A year-long industry trend of selective leaks and previews was brought to its ultimate conclusion by a relative neophyte to the business. Awesome.

The publication mentioned above trumpeted the fact that it had spent three months behind closed doors with the company and managed to bring out the whole inside story on the day (or several days before, depending on your

See **MEDIA** page 136

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COMPUTER INDUSTRY

Reduce litigation: Strategies for holistic legal planning



LEGAL VIEW

By Christopher M. Mislow
Special to CWI
Last in a three-part series.

Many physicians are turning toward the practice of holistic medicine, that is, medicine concerned not merely with the alleviation of symptoms, but with the well-being of the patient as a whole. In like fashion, legal planning should endeavor to protect the integrity of the computer vendor-user relationship, not merely to anticipate worst-case scenarios after the relationship has disintegrated.

Holistic legal planning for the vendor of computer systems requires a combination of business and legal strategies. These strategies include assessing user needs, creating accurate user expectations and affirmatively marketing limited warranties.

In securities law, there is a requirement that brokers "know thy customer." In other words, each broker should familiarize himself with his customer's needs and recommend a portfolio suitable to those needs. Computer system vendors would do well to heed this same admonition.

Users often have little appreciation of why they want a computer beyond the realization that, for example, they have too much paperwork to be done manually. Obviously, a vendor cannot perform an exhaustive systems analysis for every potential buyer; however, vendors should make an effort to ascertain precisely how and to what extent automation will benefit a user.

User expectations

Users who regard computers as electronic panaceas are bound to be disappointed. Disappointment, in turn, frequently leads to litigation. Hence, it becomes incumbent upon vendors to create accurate user expectations. Creating accurate expectations is partly a matter of substance and partly a matter of style.

The substance involves acquainting a prospective user with what computer systems can and cannot do, both generally and for that particular user. Software, for instance, must almost invariably be debugged. Software users, therefore, should be told to expect as much.

Informing a potential user

of the probable benefits and costs (a task that presupposes that the user's needs have already been assessed) is essential to the creation of accurate expectations. A user in a labor-intensive business, for example, might seek automation as a means of converting to capital-intensive production. Yet if the application involved requires

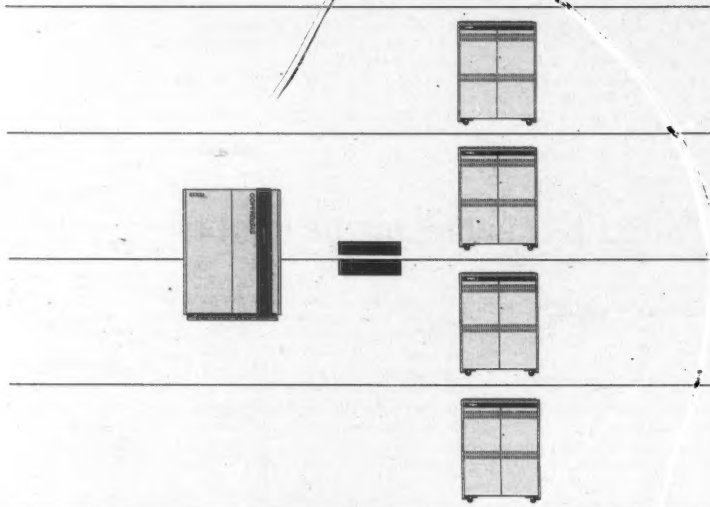
a substantial amount of interactive programming, the net result of his entry into the computer market may be simply the substitution of one form of labor (programmers) for another (production workers). Such a user should be alerted to the fallacy of his belief that installing a computer system will eliminate labor costs.

Creating accurate expectations is also a function of style. Without clear communication, misunderstandings are inevitable, and communication is seldom clear when the information is conveyed in "computerese." A recent advertisement in the *Wall Street Journal* asked: "Would you buy an electronic daisywheel printer that

prints at bidirectional 36 cycle/sec [and] has a standard 2K buffer . . . ?" To a person fluent in the argot of high tech, this is a perfectly intelligible question; but to someone accustomed to conversing in English, it is gibberish. Computer vendors, as much as the systems they sell, should endeavor to become

See LAW page 136

ELXSI vs. VAX



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Mislow is an attorney with the Salt Lake City firm of Giaque and Williams.

COMPUTER INDUSTRY

Brevity, clarity key in plan to attract venture capital



OUTSIDE LINES
James C. Anderson

Ten minutes. That's how much time a venture capitalist is going to give the first reading of a business plan. Although it's only one aspect of securing venture funds,

the business plan plays a critical role. It either encourages or discourages an investor from looking deeper, and first impressions are critical.

During those first 10 minutes, venture capitalists are looking for both an overview of a company and some very specific details. The more easily specifics can be found, the better. Don't make invest-

tors hunt for information.

An introductory executive summary is a good way to begin a business plan because it provides both. It should include:

- A brief history of the company and a description of its current status.

- A listing of the key people who will be involved, including highlights of their

qualifications.

- Very basic financial information, such as revenue projections and expected cash requirements to break even.

- A summary of the market need that identifies the niche within the marketplace and addresses how the product fits in and why a customer would buy it.

- A clear product description. A diagram is useful here.

The key is to be brief. Remember that all of the areas you touch on in the summary will be addressed more fully in the rest of the business plan. You don't fit everything in this summary.

The rest of the business plan should provide a detailed overview of every area of the company: finance, management, engineering, marketing and operations.

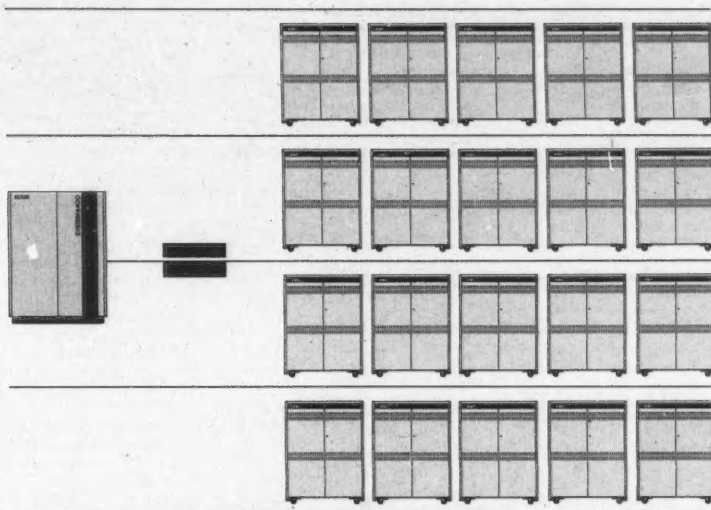
Some investors will start with the management resumes because they recognize that, as the high-technology marketplace becomes more and more competitive, management teams become increasingly important. A capable group of people can make a success of a second-rate product, but even the best product can fail if management blunders too many times.

What venture capitalists want in management is relevant experience, both for the specific position the individual will hold and within the industry in general. A successful executive at a large computer company is probably going to have trouble running a small, technologically oriented bioengineering company. There are enough risks inherent in a start-up without taking an additional risk on an individual in a key position.

The financial analysis is also a critical area to investors. Investors are looking for evidence that the founders understand where they are going to need to spend money and where and how they are going to make money in the particular industry: Are they being realistic about manufacturing costs? Have they figured out the relationship between costs, sales and profits? How do they assess their growth potential?

The entrepreneur's analysis of the product and its projected market are also critical areas. In looking at the product, the first thing investors want to know is what the product does. They need a detailed account of its features and benefits and an honest appraisal of how it fares against its competitors. Is it faster? Easier to use? Cheaper? What need does it fill? Frequently entrepreneurs present a cloudy image

See **PLAN** page 134



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Anderson is a general partner in the Palo Alto, Calif.-based venture capital firm of Merrill, Pickard, Anderson & Eyre. He previously held various marketing management positions with the Computer Group at Hewlett-Packard Co.

COMPUTER INDUSTRY

Transborder data flow regulation: Still in future

By Eileen Mahoney
Special to CW

ROME — The director general of the Intergovernmental Bureau for Informatics (IBI), speaking here recently to the second World Conference on Transborder Data Flows, said it is presently unrealistic to establish international guidelines for transborder data flows (TDF).

Professor Ferman Bernasconi suggested that instead the conference should continue and extend the educational process on TDF issues and applications as a way both to assist individual countries in negotiating bilateral agreements (regarding TDF, technology transfers and related policy matters), and the conference

could work towards international agreements at some future point.

While an IBI survey reported that some 58% of the national respondents supported the establishment of an international legal framework to guide the use of TDF, Bernasconi cited differing perceptions as a primary impediment to the creation of such guidelines. "The free flow of information means, in developing countries, access to scientific and technical information held in data bases located in the advanced countries. To transnational corporations, it means the ability to take data from the developing nations," he said.

Several keynote speakers highlighted the fact that TDF issues inter-

sect vital national development and sovereignty issues and the strategic interests of transnational businesses.

Sanin Posada, Minister for Communications of Colombia, expressed the need for TDF to facilitate access by developing countries to the scientific and technical information held in data bases in the more industrialized countries, so as to assist their development efforts. She and others said TDF and new information technologies should not become new instruments of power used to exploit the developing community.

James Grant, vice-president, Retail Banking, Royal Bank of Canada, stated that the Royal Bank, which conducts business in at least 47 coun-

tries, could not continue its operations without the free flow of information internationally. He suggested that the Royal Bank's recent initiative to establish a "free trade" in computer services agreement with the U.S., could provide a framework for future multilateral agreements on trade in services, a growing component of international data flows.

Richard Butler, secretary general of the International Telecommunications Union (ITU), said the ITU is the proper forum to address basic telecommunications aspects of TDF, due to the inseparability of telecommunications and TDF. He stressed, however, that national telecommunications authorities cannot and should not regulate the content of international data flows.

Attending the conference were representatives of 20 governments (the U.S. sent official observers) and 12 nongovernmental organizations as well as members of private organizations, research institutions and individuals from some 56 countries.

Members of developing countries expressed concern over the lack of basic communications infrastructures in their countries, the high costs of technology and related services, the absence of proper training facilities and language and cultural barriers due to the fact that most software and data base materials are only available in English or a few European languages.

Moreover, some claimed that current utilization of TDF and related technologies diminishes the development opportunities of poorer regions, thereby widening the gap between the advanced and developing countries.

According to the final conference recommendations, efforts to deal with TDF issues in the immediate future should utilize a sectoral approach based on the specific use of information.

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with IBM equipment and most look-alikes. It allows all peripherals to send and receive data at the standard IBM channel speed.

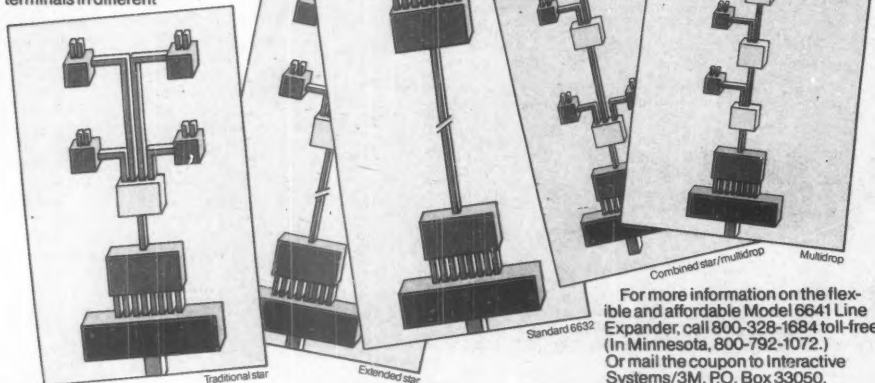
A money-saving product at a highly competitive price.

With IS/3M line expanders and multiplexers, you'll avoid the cost of pulling a new cable each time you connect another peripheral to your 3274 Controller or reconfigure your network. And you'll save a great deal of money on your data communications network, since an IS/3M system costs roughly half as much as a multicable scheme.

manufacturing expertise and quality that have established IS/3M as a leader in local area networks. It is backed by 3M's national electronic service organization, which provides local support for all IS/3M products.

Key:

- IBM 3274 Controller
- IS/3M 6632 MUX
- IS/3M 6641 Expander
- IS/3M 6608 MUX



Model 6641 Line Expanders direct data from an IS/3M 6632 Multiplexer attached to the IBM 3274 Controller to one, two, three, or four IS/3M 6608 Multiplexers that can be arranged in a variety of network

configurations such as those shown here. These line expanders make it easier for as many as 32 terminals and/or printers to be served by a single RG-62/U baseband cable.

locations, and in a number of configurations, from a single baseband cable.

This intelligent two-way data repeater/amplifier with four output ports adds to the performance of IS/3M Series 6600 headend and remote MUXes. It lets you configure your terminal network in such patterns as star, extended star, multidrop, or combined star/multidrop.

The 6600/6641 combination is fully transparent and plug-compatible

A proven technology from an experienced company.

The Model 6641 Line Expander employs repeater technology used in long-distance telephony and DP communications for years.

Since mid-1982, more than a thousand of its companion units, the Series 6600 Multiplexers, have been put to work in factories, office buildings, and government installations. The 6641 reflects the engineering and

For more information on the flexible and affordable Model 6641 Line Expander, call 800-328-1684 toll-free. (In Minnesota, 800-792-1072.) Or mail the coupon to Interactive Systems/3M, P.O. Box 33050, St. Paul, MN 55133.

- ☐ Send details on your Model 6641 Line Expander.
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Disparities cloud TDF issue

By Eileen Mahoney
Special to CW

ROME — The resolution of issues accompanying transborder data flows (TDF) is particularly difficult at present, largely due to vast disparities in the level of informatics development and differences in economic, political and cultural orientation among countries, the director general of the Intergovernmental Bureau of Informatics (IBI) said here recently.

Professor Ferman Bernasconi said that resolution of TDF issues requires international cooperation. As a first step towards such cooperation, a forum should exist for the exchange of ideas and experiences to further understand the different interests involved. From there, "the interests in opposition can try to find equilibrium," he said.

Currently, TDF is unregulated in all but a few countries. The Rome-based IBI, an intergovernmental organization composed of 40 member states primarily from the developing

See IBI page 134

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IBM to ASCII

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- buffer size
- data rate

Programmable asynchronous device parameters include:

- device type
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- output mode
- data rate

Setup data can be permanently held in EEPROM even when the Series II Plus is powered off.

+ Speed

Featuring a Z80A processor, the Series II Plus is capable of data rates up to 19.2 Kbps or, with optional Z80B processor and DMA, up to 56 Kbps as well as concurrent operation of up to 8 input/output devices at equivalent rates!

+ Code Compliance

The Series II Plus converters meet the FCC emissions requirements and are designed to satisfy those requirements when included in subsystems. The Series II Plus is also UL and CSA listed.

+ Fluency

The Series II Plus provides fluent communications in IBM SNA and Bisync protocols including 3770, 3270, HASP and 2780/3780. All Series II Plus converters support a multitude of input and output devices and are available with up to 8 ports (3 in 2780/3780 converters). You can count on the Series II Plus for fluent IBM to ASCII communications.

+ Hardware Design

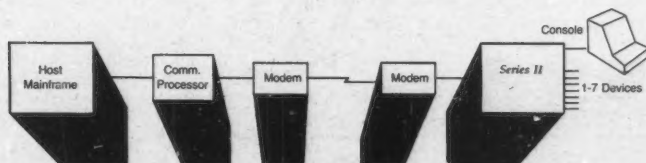
Another Series II Plus advantage is the efficient hardware design of the unit. The sleek exterior lines give way to a plug-in modular interior

which provides for maximum flexibility, a high degree of reliability and ease of maintenance. KMW's unique hardware design allows for a series of plug-in modules to provide device interfaces. Standard interface modules include Data Products 8 bit Parallel Printer interfaces, Documentation Parallel Card Reader and RS-232C Serial General Purpose interfaces.

The reliability of the Series II Plus design is exemplified by an impressive mean time between failure of over 13,000 hours. That's a real plus.

With a mean time to repair of only 30 minutes, down time is always at a minimum.

The Series II Plus is engineered for performance and the proof is in the package.



A Special Plus

The Series II Plus is available in synchronous-to-synchronous configurations including 3770 to 2780/3780 or HASP to 2780/3780. If your applications require something special, check with KMW.

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COMPUTER INDUSTRY

Lobbyists fail to obtain extension of R&D tax credit

By Mitch Betts

CW Washington Bureau

WASHINGTON, D.C. — The major 1984 tax bill heading for enactment does not include any extension of the 25% federal tax credit for research and development — which expires at the end of 1985 — despite strong lobbying by the computer industry for an extension.

Not only did the R&D tax credit extension fall victim to budget cutting this year, but industry officials acknowledged that extension legislation will face a difficult battle next year as well.

A coalition of high-technology

trade associations supports permanent extension of the credit. The coalition includes the American Electronics Association (AEA), the Computer and Business Equipment Manufacturers Association (Cbema), the Scientific Apparatus Makers Association (Sama) and the Semiconductor Industry Association [CW, Jan. 23].

The U.S. Senate version of the tax bill would have made the R&D credit a permanent fixture in the tax code, but Senate conferees agreed to drop the R&D and other tax credit provisions in return for House conferees approving cuts in Medicare spending.

Led by Ways and Means Committee Chairman Dan Rostenkowski (D-Ill.), House conferees opposed the R&D provision, on grounds that it was inappropriate for a deficit-reduction bill, and questioned its effectiveness.

"We understand that the [conference] committee's action on the credit was part of a broader decision to remove most of the revenue-losing elements from the bill and to defer action on items not expiring this year until 1985," said Dean O. Morton, chairman of the AEA and executive vice-president of Hewlett-Packard Co.

Morton stressed that the action was not a vote against the R&D credit itself. He and other industry spokes-

men said they will continue their efforts to obtain an extension by arguing that without it, company R&D programs will falter, thus worsening the competitive position of U.S. companies in world trade.

While professing some optimism about the lobbying campaign next year, industry spokesmen acknowledged that Congress' deficit-reduction fever will be at least as hot next year. "We'll have to redouble our efforts next year," said Ted Heydinger, vice-president of Cbema. "It will come up in what looks [to] be an even harsher environment."

In addition, all of the interest groups that failed to win passage of their tax credits this year will be competing again next year for approval, observed Eben Tisdale, spokesman for Sama.

The R&D credit, created in 1981, applies to 25% of a firm's increased R&D expenditures. The Senate tax bill would have made it permanent, tightened the definition of qualifying R&D to eliminate abuses, made start-up companies and joint ventures eligible, clarified that the credit covers product software development costs and encouraged contributions to universities for research.

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CW 7/84

IBM's Rodgers, Evans retire

ARMONK, N.Y. — IBM last week saw the departure of two employees who had key roles during the company's growth over the past decade, one from the systems development end of the business and the other from marketing.

Retiring July 1 after each spent more than three decades with the company were Bob O. Evans, vice-president for engineering, programming and technology; and F. G. Rodgers, vice-president, marketing.

Evans joined IBM in 1951 as a junior engineer and took part in the development of the company's first large-scale computers. Subsequently, he had overall management responsibility for development of the IBM 360 and in 1969 was named president of the Systems Development Division. He was named to his latest position in 1977.

Rodgers joined the company in 1950 and spent his first seven years in a variety of marketing assignments. In 1962, he was named vice-president of the former Data Processing Division and was promoted to president in 1967. In 1970, he was named director of marketing and four years later was named to the vice-presidential post.

Evans' responsibilities were reassigned upon his retirement. Michael J. Attardo, formerly vice-president, development and manufacturing, was named director of development. Earl F. Wheeler, formerly assistant group executive, systems development, was named director of programming.

Named to succeed Rodgers was IBM vice-president Terry R. Lautenbach, formerly assistant group executive for business development with the information systems group.

COMPUTER INDUSTRY

Serviceland applies brakes to original expansion plans

By Jeffery Boeler
CW West Coast Bureau

WESTLAKE VILLAGE, Calif. — A nationwide chain of microcomputer service centers that does 80% of its business with large corporations has reportedly scaled down its plans for near-term expansion.

Since its founding in October 1982, Serviceland, Inc. has opened nine small-systems repair offices, including three in the Greater Los Angeles area and one each in Phoenix, Dallas, Long Island, N.Y. and Sunnyvale, Calif. The chain also includes two additional service centers operating under royalty — one in Rochester, N.Y. and the other in Jacksonville, Fla.

By year's end, the company expects to expand its chain even further with the addition of another "10 or 12" repair locations, according to Serviceland President George Harmon.

Though still respectable, the firm's planned growth for the third and fourth quarters "is definitely less than what we had originally anticipated," Harmon said during a recent interview.

"For a while, we were opening service centers too fast for our cash flow and weren't controlling our expansion as well as we should have. So now, we're slowing down temporarily until we can make the operations we already have fully function-

al," he said.

Serviceland belongs to a growing fraternity of microcomputer service organizations that cater primarily to users in large corporations. Other players in the emerging personal computer repair business include the major hardware vendors like IBM, with their large in-house maintenance forces and the

independent service organizations, including Businessland, Inc., Computerland, Inc. and Sears Roebuck & Co.

Also vying for a piece of the microcomputer service action are the traditional third-party maintenance firms, such as Sorbus, Inc., TRW, Inc. and Western Union Corp.

Like the large hardware

vendors, Serviceland makes "house calls" to customer sites rather than forcing microcomputer users to travel to a central repair depot to get their balky equipment fixed. "After years of dealing with IBM and [Xerox Corp.], customers have been conditioned to expect on-site service," especially accounts with 10 to 50 installed mi-

cros, Harmon said.

But like Sears and the other independent personal computer service firms, Serviceland also repairs mixed-vendor configurations — a consideration seldom extended by the major hardware manufacturers, which typically refuse to work on other companies' equipment, Harmon said.

DG posts record gains

WESTBORO, Mass. — Data General Corp. recently reported third-quarter profits before an extraordinary gain were \$16.1 million, or 61 cents per share, compared with \$4.3 million, or 18 cents per share, for the year-earlier period, according to a company spokesman.

The company also announced the highest quarterly revenues in its history.

For the quarter ended June 2, the company experienced revenues of \$277.1 million, representing a 47% increase over the \$188.7 million reported in the third quarter of 1983.

The company also recorded an extraordinary gain of \$3.5 million, or 13 cents per share, from the exchange of common stock for \$11.9 million in sinking-fund debentures.

For the first nine months of the fiscal year, the company has recorded revenues of \$745.1 million and profits of \$37.7 million before the extraordinary gain, the spokesman said.

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COMPUTER INDUSTRY

U.S. may sell Fujitsu's VP-100, 200

By Tom Henkel
CW Staff

NEW YORK — Fujitsu, Ltd. last week said it is actively considering selling its VP-100 and VP-200 supercomputers in the U.S.

A spokesman here for the Tokyo-based company confirmed that while no formal plans have been made, Fujitsu is currently negotiating with U.S.-based Amdahl Corp. as one possible marketer of the Fujitsu supercomputers. Amdahl currently sells Fujitsu-made IBM-compatible mainframes, and Fujitsu owns roughly 49% of Amdahl Corp.

If Fujitsu decides to market its supercomputers in the U.S., it will become the first of three Japanese supercomputer makers to break into the narrow U.S. market for the multimillion-dollar large-scale scientific processing systems.

Two so far

Currently, there are two major domestic manufacturers of supercomputers: Cray Research, Inc., which sells the Cray XMP; and Control Data Corp., which markets the Cyber 205. A third domestic vendor, Denelcor, Inc., markets a Heterogeneous Element Processor 1000.

Two other Japanese companies, Hitachi, Ltd. and NEC Corp., have also announced supercomputers, but currently those firms are marketing the machines only in Japan.

Industry watchers in the U.S. say details of supercomputers from all three companies are somewhat sketchy. But researchers like Dr. Sidney Fernbach believe Fujitsu and Hitachi supercomputers offer performance at least slightly better than the domestically produced supercomputers.

Benchmark results

As examples, Fernbach, in a recent interview (CW, April 2), quoted benchmarks conducted at the Lawrence Livermore Laboratory in Livermore, Calif., that revealed the VP-100 was capable of performing approximately 80 million floating point operation/sec (Mflops), while the VP-200 was rated at 131 Mflops. Fernbach said the Cray XMP was rated at 53 Mflops.

Supercomputers are typically used for government research, such as weather system modeling and nuclear research.

Other typical uses for the scientific systems include oil exploration and sophisticated modeling applications.

MDS posts \$49.6 million loss for fiscal year

PARSIPPANY, N.J. — Mohawk Data Sciences Corp. (MDS) recently reported a \$49.6 million net loss for the fiscal year ended April 30, with losses in the fourth quarter of \$56.4 million largely due to discontinuance of its MDS Trivex Division.

The fiscal year loss, equal to \$3.88 per share, compares to a 1983 fiscal year profit of

\$11.4 million, or 79 cents per share, before an extraordinary item that pushed net income in 1983 to \$12 million, the company reported.

The fourth-quarter loss, equal to \$3.88 per share, compares to year-earlier profits of \$2.8 million, or 20 cents per share.

Revenues for the fiscal year were \$402.4 million,

compared to \$363.6 million a year earlier. Fourth-quarter revenues were \$97.4 million, compared to \$95.2 million in the year-earlier quarter.

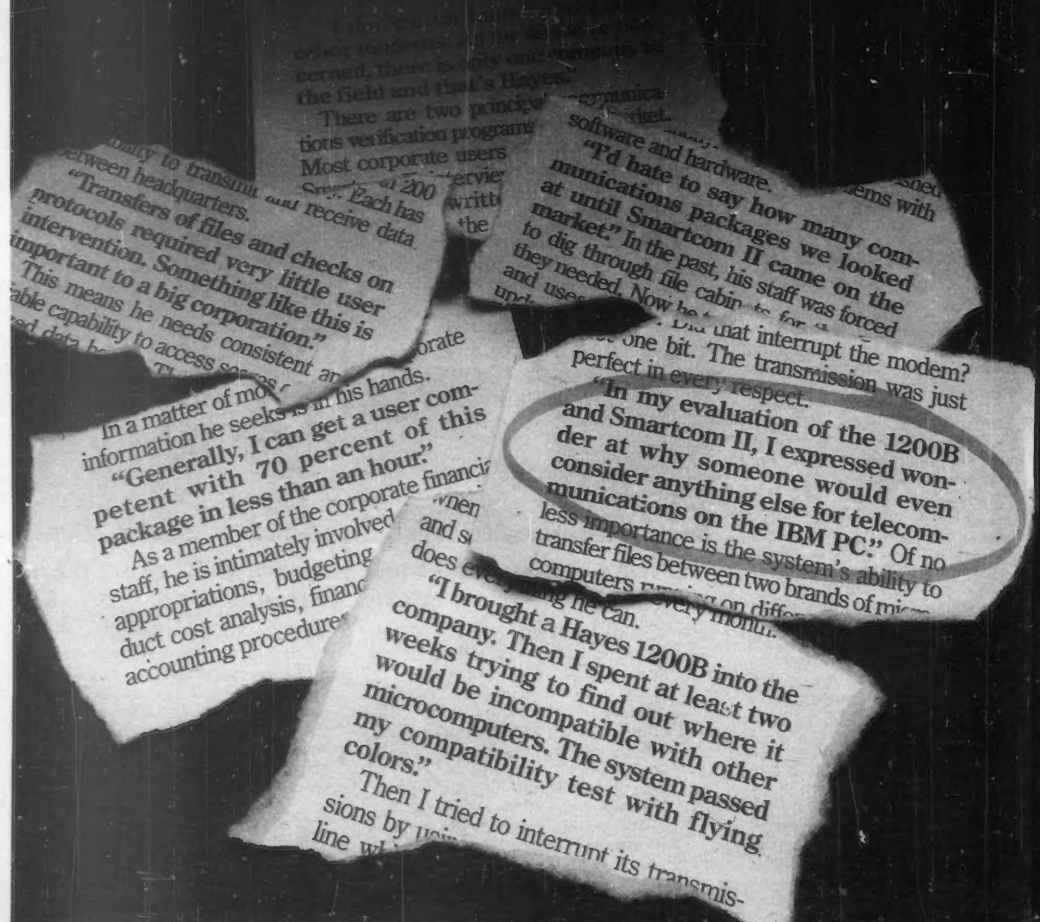
Ralph H. O'Brien, chairman and president, said provisions for close down and severance costs of activities in Los Gatos, Calif., as a result of consolidation, added to the fourth-quarter loss, as

did various legal matters.

"They represent in each case what we believe to be necessary responses to changing conditions within different segments of our marketplace," O'Brien said.

"By taking these actions at this time, we feel we have positioned MDS for solid earnings performance in the future," he added.

Look what DP execs
and Systems Analysts
have to say about
Hayes Smartmodem 1200B
and Smartcom II software.



COMPUTER INDUSTRY

Both parties see GM's purchase of EDS having positive impact

By Peter Bartolik
CW Staff

DALLAS — The recent acquisition of Electronic Data Systems Corp. (EDS) by General Motors Corp. provides both entities with tangible benefits, according to officials of both.

EDS' systems and processing techniques will be applied throughout GM, and the

merging of both companies' "communications facilities and personnel will result in an extremely effective worldwide voice and data communications network, which will reduce costs and provide outstanding additional business opportunities in the high-technology industry," GM Chairman Roger B. Smith noted.

GM's experience in robotics and factory automation, on the other hand, potentially will provide EDS with new services to expand "in a marketplace where EDS has not typically had a large presence in the past," observed H. Ross Perot, EDS founder and chairman.

The price of the acquisition was generally reported

to be more than \$2.5 billion in cash and could potentially be more if EDS shares were traded for a combination of cash, promissory notes and a newly created class of GM stock. As a result, the \$1,000 with which Perot reportedly founded the company 22 years ago has mushroomed into a reported \$1 billion holding for him and his fam-

ily, who control the largest block of EDS stock.

GM said it will operate EDS as an autonomous subsidiary, much as its financial subsidiary, General Motors Acceptance Corp., operates. The colorful Perot, who once organized a raid on postrevolutionary Iran to rescue two employees, will continue as chairman and report directly to Smith. EDS President Morton H. Meyerson will continue in that capacity.

Talks between the two companies were acknowledged several weeks earlier, with speculation focusing on various types of arrangements. GM spokesman Clifford Merriott declined to comment on whether arrangements other than an acquisition were explored. "This is the way it came down," he said.

As the biggest of the revitalized U.S. auto producers, GM has reportedly invested heavily in computer equipment and factory automation. "We have everything from a [Cray Research, Inc. supercomputer] on down," Merriott noted.

Smith, who in recent months has openly declared GM's intent to diversify from its cyclical-prone auto industry, said at the time of the announcement, "We anticipate becoming an important participant in the growing information services marketplace, as EDS will market manufacturing and other systems developed by GM."

An EDS spokeswoman said the data processing services company has to date had "a very minor part" in the expanding factory automation field. "There is a lot of room for EDS and GM to make an impact," she added.

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Smartcom II also lets you preprogram macros, and reduces lengthy dial-up and log-on sequences to a single keystroke. It stores communications parameters for 25 remote systems in a directory on Smartcom II. Another Smartcom II directory contains a list of every file stored on a disk. Users can create, display, list, name, re-name or erase any file from the screen.

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Smartmodem 1200B: Direct connect. Auto-answer, dial and disconnect. Touch-Tone and pulse dialing. Full or half duplex. Automatic speed selection. Voice/data communications on same line. 28½ microprocessor with 4K byte control program. Self-test. Two-year limited warranty.

Smartcom II: Prints data while recording on disk. Stores telephone numbers and communication parameters. Defines and stores log-on sequences and 25 remote system commands. Accesses Smartmodem timing parameters, dialing type, etc. requires 96 K memory. Supports serial or parallel printer. On-line help.

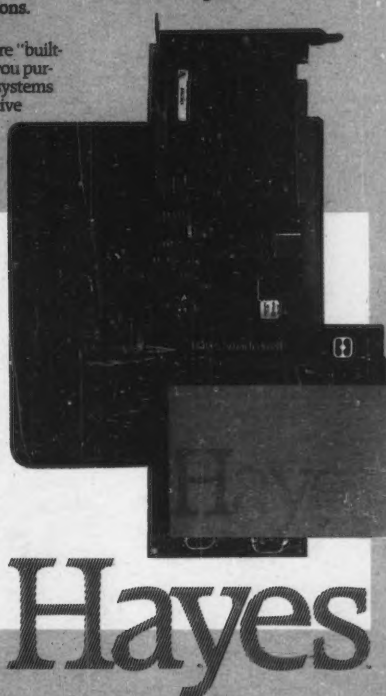
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DEC expands lease group

MAYNARD, Mass. — Digital Equipment Corp. recently formed a new subsidiary, Digital Equipment Finance Corp., as part of a program to expand leasing and financing services for customers.

The new subsidiary will be managed through the company's U.S. Customer Finance Group, which had previously shared point-of-sale leasing and finance servicing with Digital Leasing, a unit of the U.S. Leasing Corp.

According to a DEC spokesman, the Digital Leasing unit had previously provided brokering services for smaller customers, with U.S. Customer Finance Group performing similar services for government and large customers.

Quotes reprinted from product review in *LAST*, The Business Software Magazine, June, 1984, Pages 26, 28-29.

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COMPUTER INDUSTRY

IBI from page 128

community — with France, Spain and Italy the more industrialized members — sponsored the second world conference on TDF policies to provide an opportunity for participants to examine the legal aspects of TDF.

Some conference participants, particularly from developing countries, focused attention on the negative economic, political and cultural impacts of current uses

of international data flows guided by the free flow of information.

Bernasconi, during a press conference at the conclusion of the conference, admitted that information flows "can be a tool of empire building." History has shown, he continued, that "once a country has a technology, and has the capacity to manage this technology, there has been a trend to use it for its own benefit." Current trends in this direction, he said, "could

make existing inequalities even more marked."

It is the responsibility of both the developing countries and those of the advanced industrialized regions to try to eliminate the negative aspects of TDF, he said. He urged developing countries to participate in the ongoing process of analysis and debate.

"In two to four years, those who have technology will fix the situation in a way that benefits them," he said.

PLAN from page 127

of their product by talking too much about what it might do.

The marketing section seems to pose the most problems for entrepreneurs and detracts from many otherwise good plans. Because it is the new applications of technology — not the technology itself — that is driving the industry, marketing is rapidly becoming the component that distinguishes one com-

pany from another. Good marketing will help ensure that companies are using the technology to solve real problems.

A complete marketing plan should not only describe the marketplace and the target customer, but also project the growth of the market and the forces driving that growth.

A discussion of distribution is essential. All projections should be supported with well-researched and documented data. The investor wants to see a clear connection between your product and the marketplace.

A discussion of any risks the venture will encounter is an appropriate addition to a business plan.

Problems occur in all companies and acknowledging them from the start shows you have thought through your plans. Venture capitalists do not like to be surprised and they don't like to have entrepreneurs surprised either.

Neat, well-organized business plans make a favorable impression; simply be clear, complete and honest. Graphs and charts can be very useful, but should be included only if they clarify or add to the text.

Sales campaign

A business plan is only part of what is really your sales campaign. Before you send it to a venture capitalist, get an introduction. Plans that come in cold are at a disadvantage.

Give the potential investor a chance to read the plan before setting up a meeting and then have a whiz-bang presentation ready for that meeting.

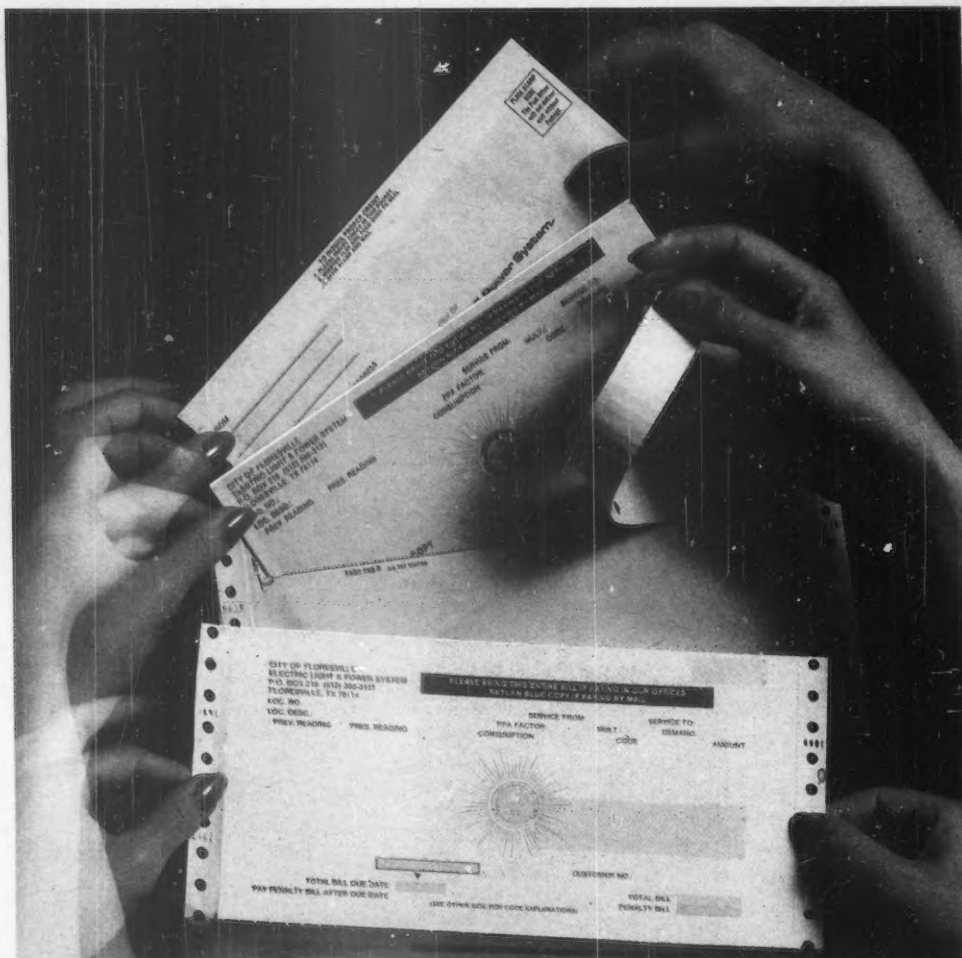
It is in your best interest to investigate venture capital firms before you start inviting them to investigate you. Find out which ones invest in your industry and the size of the investments the firm makes.

Do they already have dollars invested in your competitors and will that influence their view of your plan?

If you get rejected, don't overreact. Many plans that go on to be successful companies are turned down once or twice. Try to figure out why your plan did not get funding.

You can get useful information by asking general questions such as, "What did you think of our marketing plan?"

If your business plan does what it should do, you are going to get much more than those first 10 minutes. That business plan will be the beginning of many discussions and will become a desktop reference on the company. The first 10 minutes should get you more time and the more time you get from a venture capitalist, the more likely you are to get funds.

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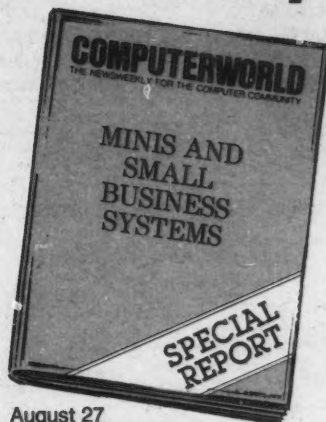
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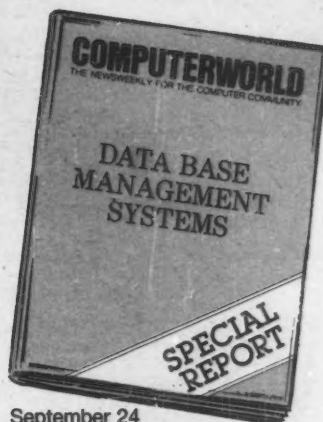
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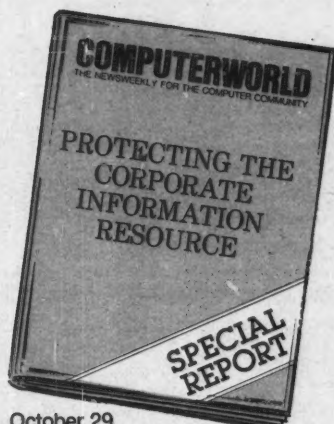
August 27

Minis and small business systems
We'll take a close look at the growing number of applications available. Plus we'll include reports from users on the problems they've had in selecting and implementing these systems, and how they solved them. Also, we'll offer vendors' suggestions on how to increase the efficiency and cost-effectiveness of minis and small business systems.
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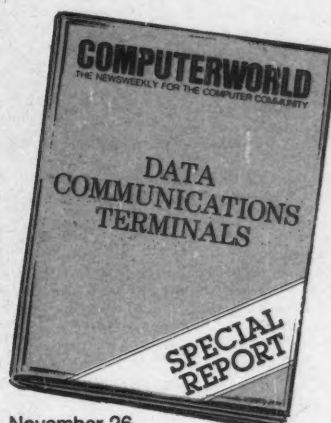
September 24

Data Base Management Systems
A comprehensive report geared toward a realistic understanding of DBMS. We'll include articles from users and industry experts on how to evaluate, select, implement, and trouble-shoot DBMS. And we'll update readers on recent developments, as well as offer users' solutions to common and not-so-common DBMS problems.
Closes September 7



October 29

Protecting the Corporate Information Resource
We'll discuss how to protect hardware & software resources, people resources, and physical plants. There'll be articles on: uninterruptible power supplies, data security monitors, data encryption software, disaster recovery centers (offsite data storage), fault-tolerant processing, data transmission security, protecting the computer room, and contingency planning.
Closes October 12



November 26

Data Communications Terminals
Users and vendors will comment on how terminals are making computers more responsive to organizational needs. Topics include: how to get the most out of dumb terminals; an update on smart and intelligent terminals; and guidelines for determining terminal's needs and selecting the equipment to meet them.
Closes November 9



December 31 & January 7

'85 Forecast
Our annual review and forecast issue. We'll examine some of the major events of 1984, and explore what lies ahead in 1985.
Closes December 14

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COMPUTER INDUSTRY

LAW from page 126

user-friendly.

Precision is also important. Vague descriptions such as "an inventory control program" invite confusion over exactly what the vendor has agreed to provide. Where a suitable English synonym is unavailable, technical terms may be necessary; but, where such terms are necessary, they should be explained. A first-time user will require a relatively painstaking translation of technical terms; an experienced user may require none at all. The proper level of linguistic sophistication will become apparent from a diligent assessment of the user and his needs.

Affirmative warranties

With the increased number of entries into the computer vending market, it is becoming more difficult

Users who regard computers as electronic panaceas are bound to be disappointed. Disappointment, in turn, frequently leads to litigation. Hence, it becomes incumbent upon vendors to create accurate user expectations.

these days to compete on the basis of price or quality.

As a consequence, vendors are being forced to compete in marketing. This pressure can result in poor sales practices, such as exaggerated product claims, which in the short run injure the user and in the long run injure the vendor. Alternatively, the pressure to compete in marketing can result in the use of techniques benefiting both parties to the transaction. Among these techniques is the promotion of limited warranties.

Limited warranties are hybrid creatures. On the one hand, they usually contain

most of the standardized contract clauses discussed last week, in particular the warranty disclaimer and limitation of remedies provisions; hence the description "limited" warranty. On the other hand, unlike the standard contract clauses, which are a defensive legal bulwark announcing primarily what the vendor will not do, limited warranties set forth at greater length what the vendor and his system will do.

Rather than merely stating, for example, that the user's sole remedy in the event of software malfunction is servicing by the vendor or by a third party, a well-drafted

limited warranty could specify the particular applications involved, point out that software in general is susceptible to bugs, and thus that debugging may be necessary, and describe in detail those steps that the vendor will take to correct the problem. In this fashion, what might otherwise deter a potential user, or at best be a neutral factor, becomes a positive selling point. Such a document, indeed, could be promoted as a "systems support agreement."

Obviously, limited warranties benefit the vendor by circumscribing his legal liability and affording him another means of marketing his product. But they also educate the user and help to disabuse him of unrealistic expectations, thereby rendering it more likely that, if he chooses to acquire a computer system, the acquisition will truly be to his advantage.

Holistic legal planning for computer vendors is no more a panacea than are computers themselves. Malfunctions will continue to occur, as will lawsuits arising from those malfunctions. But the frequency of litigation can at least be reduced by debugging the manner in which computer systems are marketed.

MEDIA from page 125

newsstand) the company brought out its new product.

According to a press package issued by *Personal Computing*, the staff of seasoned journalists — not computer hacks, it was stressed, but real live journalists — was "initially disappointed" with the product. But, lo and behold, after spending three months with the product and

its producers, that reaction changed: "After a while, their marketing strategy began to sink in and it all made sense." It sunk in so much that the publication sent out a press release about how the new company was ready and able to take on the giant.

Praise be. We could all learn from this: When advance information is not available, maybe professional journalists will defer from

reporting on initial disappointments and instead hold off and wait to be convinced by vendors. Can you imagine if Richard Nixon had decided to take Woodward and Bernstein into confidence for a few months? We might have been spared Jerry Ford and Jimmy Carter and . . .

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WANG from page 125

that we can provide," Wang said.

All of the networks will be digital. The Massachusetts system uses digital microwave radio equipment supplied by the Farion Division

of Harris Corp. and operates in the 6-GHz common carrier frequency band.

Fiber optics and free air optical technologies were mentioned as possible microwave alternatives.

The leased-circuit capacity of the network will be

used to carry both voice and data traffic. The demand for high-speed data services is growing at a "phenomenal rate," according to Wang, "but we cannot ignore the fact that 80% of annual [telecommunications] operating revenues come from the voice area."

A learning experience

Wang admitted that the foray into the carrier business has been a learning experience, particularly in coming to terms with operating in a regulated environment: "We're learning every day all of the regulations we have to go through which are foreign to us." This has, in part, necessitated that the company climb the learning curb slowly.

Wang Labs' foray into the common carrier business is unusual, but not that surprising given Wang's other quests to amass communications-related assets.

In November 1982, Wang Labs announced that it had acquired a minority interest in United States Satellite Systems, Inc., a company that intends to provide digital satellite communications services to large corporations. In April of this year, the company announced that it had purchased a 15% interest in Intecom, Inc., a manufacturer of private branch exchanges.

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COMPUTER INDUSTRY

UNION from page 125

GE said the "flexible machining center" is needed to maintain a competitive edge with the Pratt & Whitney Aircraft Group, its Connecticut-based archrival in the military aircraft business. Pratt & Whitney, a division of United Technologies Corp., earlier this year opened a \$200 million, highly automated factory in Columbus, Ga.

Job security

But union members were more concerned with job security than with a struggle between two corporate giants for lucrative military contracts. GE has insisted that the automated plant is not the initial step in replacing workers with robots. The company even signed a letter of intent with the union stating that jobs will not be lost and may actually increase because of an enhanced competitive position.

"Automation is going to be a more gradual process than most people think, and it will be present to a smaller degree than most people here think," Krebs said. "My vision is that there are going to be thousands of skilled workers working in the jet engine business as far as I can see in the future."

But plant workers were still uneasy about new work rules, which include some 12-hour shifts and three- and four-day work weeks. Employees presently work eight-hour shifts, five days a week.

"I've been working in the plant nearly 24 years... and it's the big-

gest issue that I've seen us having to face," said Kevin Mahar, president of Local 201, one of GE's most activist and independent locals. "But we have to face it, because technology is not going to go away."

"We figure it's a learning process for us," he added. "It will give us an opportunity to study the new technology, work with it, have a handle on it, have some control over it."

Besides the \$52 million for the new plant, the aircraft group has asked GE to invest as much as \$375 million to modernize plants in Lynn and nearby cities by 1988.

GE made it known that if the union nixed the proposal, the company would most likely build the new plant at its nonunion shops in New Hampshire or in the South. As Krebs put it, "There's no point in building high tech where people are hostile to it."

Krebs, whose idea it was to build the plant in Lynn, said he had to win over skeptical company officials who questioned investing in an old, unionized factory. GE also operates satellite plants in New Hampshire, North Carolina and Vermont that are not unionized.

City officials in financially troubled Lynn were delighted and relieved by the union's decision. GE, the town's largest employer, reportedly paid \$2 million of the \$34 million in property taxes collected by the city last year.

The flexible machining center, which is expected to double production throughput, will include test cells for turning, milling and drilling



A GE plant worker operates a machine for drilling and milling jet engine turbine casings, a task that will become even more highly automated.

aircraft engine parts. The equipment will include advanced-design lathes, grinders, vertical machining centers and a variety of computers, robotic devices and controls.

Small golf-cart-like vehicles will transport engine parts along the manufacturing line, and robotic arms will place the parts onto automated machinery in a "closed-loop" operation, according to O.M. Hassan, the division's manager of computer-integrated manufacturing. "We're trying to buy smart capacity," he said in explaining the purpose of the move to-

ward increased automation.

The machining center will consist of 55,000 sq ft of manufacturing floor space and will employ 140 persons, 100 of them union members. To increase efficiency, employees will have to work three 12-hour shifts one week and four 12-hour shifts the next. The workers also will have to perform more jobs than the union contract presently permits.

Pratt & Whitney's facility in Georgia has 640,000 sq ft of manufacturing space and employs 350 people. The plant, which is not yet fully operational, utilizes some 100 computers, including two IBM 4341s and six Digital Equipment Corp. VAX-11/780s. Fifty robotic machines also are being used there, according to Robert Weiss, a Pratt & Whitney spokesman.

Although GE and Local 201 have had their share of struggles in the past, on this issue at least, union members evidently decided that their interests and those of the company shared some common ground.

"We've always been a very vocal and outspoken local, and we're not afraid of this," Murphy said. "We're willing to take a shot at anything that could potentially provide jobs for us."

CA acquires Johnson Systems

JERICHO, N.Y. — Computer Associates International, Inc. recently announced it acquired all of the stock of privately owned Johnson Systems, Inc. for \$16 million.

Johnson Systems is a systems software company specializing in operations management software packages for data center facilities. Its products reportedly are designed to manage the performance of computer installations and automate output.

Anthony W. Wang, executive vice-president of Computer Associates,

said the acquisition complements the company's existing products. "Our Operations Management Software series will be enhanced with the Johnson Systems products," Wang said. "This is especially so in the areas of product integration and marketplace penetration. Second, the strength of Johnson Systems' software in the OS/MVS marketplace provides a special plus to the transaction." Johnson Systems realized revenues of more than \$10 million in 1983, according to Computer Associates.

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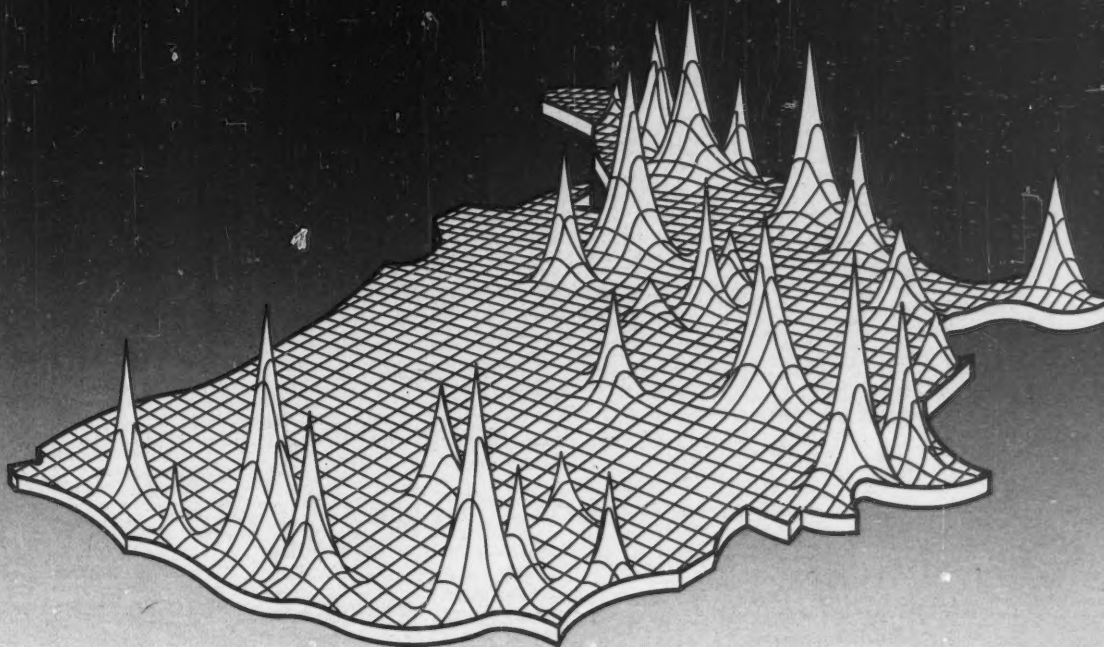
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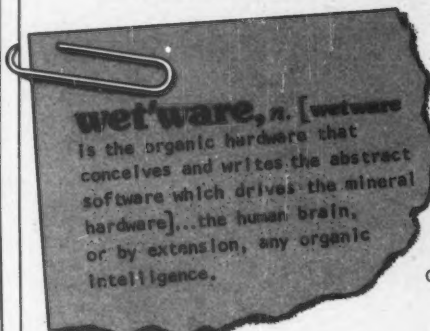
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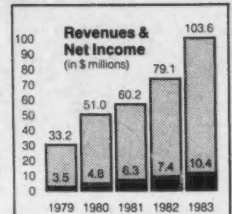
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UNIX*, C, PDP11, M68000

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97 Humboldt Street
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Equal Opportunity Employer M/F/H/V

HUGHES

NCC COMPUTER CONFEREES:

Are you a specialist in software technology projects?

Then consider joining the people behind advanced software technology at Hughes Ground Systems Group in Southern California.

Our Software Technology organization has developed extensive software expertise, tools and facilities for a variety of R&D, new business and on-going product line applications. These resources and our success in producing software development and support environments create an excellent opportunity for you.

We are seeking a Software Advanced Technology Projects Specialist with the unique combination of software competence and marketing know-how that will help us further our software technology thrusts in the government/military market.

You will be responsible for preparation and follow-through of marketing plans, establishing contacts and determining customer needs as well as organizing and delivering presentations to customers. Additional activities will include preparing specifications and proposals for new software technology projects and identifying new software technology areas.

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Join Hughes in Southern California. You'll enjoy an ideal climate and lifestyle and the competitive salary and benefits we offer. As the world leader in electronics, we provide family medical, dental and vision-care coverage, a tax-deferred savings plan, continuing education programs, relocation assistance and much more.

For more information or to schedule an interview in Las Vegas during NCC, please call Bob Jones COLLECT at (714) 732-3849. Or send your resume to: Hughes Ground Systems, Employment Dept. WC-7B, P.O. Box 4275, Fullerton, CA 92634. Equal Opportunity Employer. U.S. Citizenship Required.

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AIRCRAFT COMPANY

GROUND SYSTEMS

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We're Making Everyone Else's List, What About Yours?

When Tandem made *Fortune* magazine's list of America's 500 largest industrial corporations, we were proud. But when we showed up again in the recently published "The 100 Best Companies to Work for in America," we were even prouder. Because one of the hallmarks at Tandem is that our employees like to work here. And they make no secret of it.

It's not too late to put Tandem first on your list. Call us today to find out more about the following opportunities.

Operating System

Interprocess Message System Design and Implementation

Large systems development experience required. Design experience with multi-programming operating systems is a must. Knowledge of distributed processing architectures is important. Three to five years' experience.

Transaction Management Facilities Design and Implementation

Design experience with transaction management, file systems, access methods, locking, failure recovery required. Knowledge of fault-tolerance desired. Three to five years' experience in large systems development required.

File Management

Participate in the design, implementation and testing of a file management system to support current and future capabilities. Requires three-plus years' experience in the design/implementation of multi-user file management systems for large scale systems. Experience with multiple keyed access methods, record locking, caching, directory management, transaction processing and high-level data base management is desired.

Data Base

Relational Query Language

Participate in the design, implementation and testing of enhancements to Tandem's relational query language and report writer. One to two-plus years of experience maintaining and enhancing either a powerful report writer product (like NOMAD) or relational query products such as INGRES and the SQL-based products.

Disc Driver

Participate in the design, implementation and testing of the disc driver software for Tandem's disc peripherals. Requires three-plus years' experience in the design/implementation of disc driver software for large scale systems. Experience with disc media error recovery techniques, controller and I/O channel error handling, interrupt handling is desired.

Low-Level Utilities

Participate in the design, implementation and testing of low-level utilities for disc management, disc formatting, sparing of defective media, and file integrity checking and repair. Requires two-plus years' experience in the design/implementation of disc oriented utilities for medium to large scale systems.

Relational Data Base Management

Several positions are available in the design and development of relational data base management systems. Three-plus years' experience in design and implementation of a relational data base management system, understanding of query processing, various data access methods, data description and data manipulation concepts required.

Extended Transaction QA

Review requirements, external specifications and designs for future enhancements for Tandem's extended transaction product (TRANSFER). Also maintain and enhance existing tools and design new ones as needed. Two-plus years' experience in systems software development; familiarity with data base management systems, interprocess communication and QA preferred.

Languages

Section Manager

Responsible for managing design and development of FORTRAN, COBOL and other industry standard compilers for Tandem computers. Requires in-depth knowledge of compiler technology and stack machine architectures as well as significant managerial experience.

Additional opportunities are currently available in the following three areas.

- Provide development support for high-level languages. Interface with outside party delivering software under contract, coordinate problem reporting and resolution and develop test cases. Two-plus years' experience with systems software development required; high-level language compilers preferred.
- Participate in the development of compilers for sophisticated, block-structured languages and assure that finished product meets requirements and specifications. Two-plus years' experience with compiler development preferred.
- This position requires an individual with experience porting an industry standard compiler and three-plus years' experience in developing code generators for compilers.

Tools

Immediate opportunities are currently available in the following areas.

- Participate in the development and/or enhancement of symbolic debuggers and linkage editors for new and existing products. Enhance existing and new test libraries and tools. Three-plus years' experience using and/or writing development tools preferred. An equivalent combination of education and experience will be considered.

- Specify, design, and implement an automated terminal simulator which will be used for automated testing of interactive products. Terminal simulator must work in a network, as well as a stand-alone environment, and will provide analysis test runs. Five-plus years' experience in systems software, hardware/software emulators or related experience preferred.

Data Communications

Network Management Design and Implementation

Design experience with network management and network protocols required. Five years of large system development required.

Electronic Mail/OA

Participate in the development of high-level OA applications such as electronic mail, personal productivity tools, editors and word processors which support attachments to a wide variety of terminals and OA workstations to Tandem systems. One year of experience in software development/applications using, developing and/or performing quality assurance on OA products required.

TCP/IP Design and Development

Three to five years' network software development experience required.

Data Comm Programmer

Develop windowing and virtual terminal capabilities within Tandem access methods.

Senior Software Technical Writers

Create documentation to support data communications products including network management tools, X.25 and SNA.

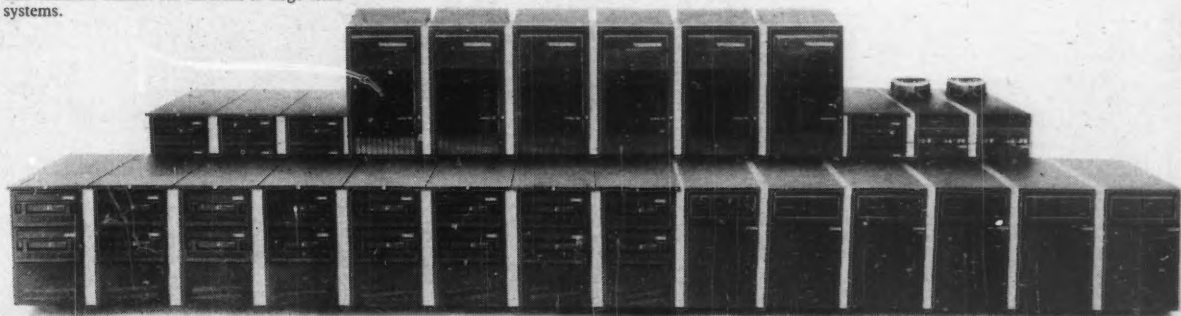
Create documentation to support operating system performance tools. Knowledge of operating systems required, preferably minicomputers or mainframes.

Both positions require expertise in writing complex software manuals and ability to communicate with software designers.

Call Fran Kaspar COLLECT at (408) 725-6300 for more details and ask about our excellent benefits which include a paid six-week sabbatical. Or send your resume to her attention, Tandem Computers Inc., Dept 7/1-FK, 19333 Vallico Parkway, Cupertino, CA 95014. We are an equal opportunity employer.

Principals only, please.

TANDEM



Makers of TXP* the most powerful on-line computer in business today.

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Computer Graphics Engineer

The Challenge

General Electric's Research and Development Center has several openings for experienced computer graphics professionals in its Information System Operation Application Services to develop algorithms and software for a broad range of challenging advanced technology programs.

The Environment

The R&D Center—one of the world's leading laboratories linking basic research to applications—provides a challenging work environment in the graphics area:

- Distributed VAX 11's running VMS and UNIX operating systems
- IBM 3083
- Color frame buffers and cameras
- High performance 3D vector refresh systems
- Rich language capabilities including C, Lisp, Pascal

Candidate Profile

Education: MS or PhD in Computer Science/Engineering. Experience in one or more of the following:

- VAX-VMS or UNIX
- IBM-VM
- Color frame buffers
- High performance vector refresh systems
- Device independent graphics concepts

Other Opportunities

Several attractive openings also exist for:

- Office Systems Development
- Engineering Workstation Engineer

Contact

Investigate excellent salaries, benefits and growth prospects by sending your confidential resume to Mr. Neff T. Dietrich, University Relations and Recruiting, Ref. 48L, General Electric Research & Development Center, P.O. Box 8, Schenectady, NY 12301.

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at General Electric

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Come with the leader in the field of computerized mapping!
We have current opportunities for:

SR. SOFTWARE ENGINEER

We are looking for a Sr. Software Engineer who will participate in the development, testing, documentation, and maintenance of complex software programs. The successful candidate will have experience in:

- Minicomputers
- Fortran, PL/I, and Assembler
- Structured analysis, design and programming techniques
- Data General software and hardware experience a must
- Excellent communication skills and the ability to work in a team environment

SOFTWARE ENGINEERS

We are looking for Software Engineers with a minimum of 3 years experience in:

- Minicomputers
- Commercial applications design
- Fortran and/or PL/I
- Data General INFOS experience would be a definite plus

We offer competitive starting salaries, relocation allowance and outstanding career advancement opportunities and a comprehensive benefit package. Qualified applicants seeking a challenging career working with the market leader should send a resume with salary history and requirements to:

Laura Tormaquindici
BUTLER COMPUTER GRAPHICS, INC.
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Equal Opportunity Employer

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Incorporated Agency
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PROGRAMMER ANALYST

These positions require a Bachelor's Degree in Business Administration, Mathematics, Engineering, Computer Sciences, or related fields. Experience requirements include two or more years of applicable systems analysis and programming work. Cobol programming experience is a must. Job requirements include the ability to communicate effectively with a wide range of business and engineering people and a solid foundation structured methods of design and programming.

VAX/VMS

(PROGRAMMER/ANALYST)

We have acquired a state-of-the-art relational data base management system implemented in hardware as a back-end processor interfaced to a VAX/VMS host. We are looking for an individual with in-depth experience in the VAX/VMS operating system to provide technical software support services to Programmers, Systems Analysts, and Operations personnel. The requirements for this position also include a Bachelor's Degree in Business Administration, Mathematics, Computer Sciences, or related fields.

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Replies held confidential

Send resumes to:

Trudie L. Rainey

Employment Section Chief

Reynolds Electrical & Engineering Co., Inc.

Post Office Box 14400

Las Vegas, NV 89114-4400

(702) 295-1900

IDAHO

Immediate openings for Systems Programmers with a minimum of four years experience in MVS, CICS or VM.

MVS

This position will assist in converting our DOS/SE system to MVS on an IBM 3083, and will be responsible for installation and maintenance of MVS/SP and associated program products. In addition, this person will be a training reference for our DOS systems programmers. The MVS/SP environment includes IMS/DB, CICS, ACF/TAM, ACF/NCP, JES2, TSO, ROSCOE, SMP, UCC1, UCC2, UCC3. Experience with IMS/DB, SMP/E and security systems is highly desirable.

VM

This position is responsible for installation and maintenance of VM/CMS and software running under CMS on an IBM 3083 in an Information Center environment. Products installed include FOCUS, SAS, DISPLA, TEL-A-GRAF, DCF, RSCS, GDQM, Pass-Through, VMAP, SMART, ISPF, PL/I, FORTRAN. Experience working with non-DP users or in an Information Center environment is a definite plus.

CICS

This position requires recent experience generating, maintaining and tuning CICS/VS, ACF/VTAM, ACF/NCP and associated teleprocessing systems software. Solid problem diagnosis and debugging skills using command level techniques, plus the ability to work effectively with the development staff are necessary. Additional software includes Guardian, Interlist, Omegamem, CTOP and CPARS. Experience with IMS/DB, PL/I and VSAM is desirable.

Positions are in Data Processing located at Idaho Power

Corporate Headquarters in Boise, Idaho

Send Resume and Salary Requirements to:

Mr. John C. Dominick

IDAHO POWER COMPANY

P.O. Box 70

Boise, Idaho 83707

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- OPERATING SYSTEMS
- DATA COMMUNICATIONS
- NETWORKING
- PASCAL, C, LISP

If you are a highly motivated, creative individual with a strong Computer Science background (BS/MS—experience preferred), please send your resume for prompt and confidential consideration.

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Hewlett-Packard
Box C-1
3404 E. Harmony Rd.
Ft. Collins, CO 80525

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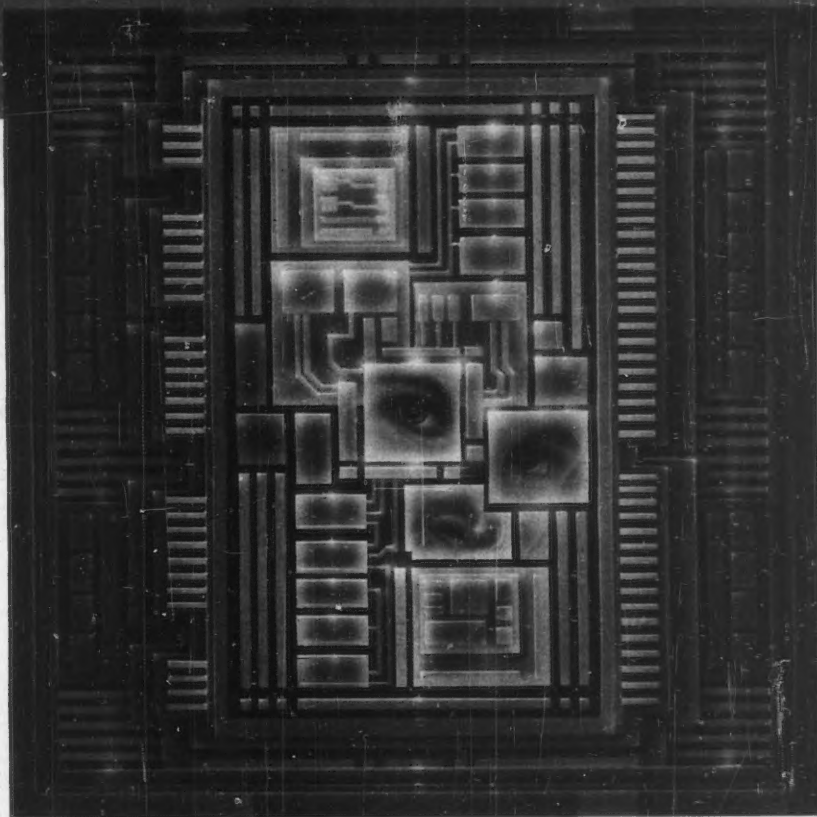
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SOFTWARE & HARDWARE SYSTEMS CAREER OPPORTUNITIES

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The ability to adapt quickly to rapid changes in both market and technology is the mark of an Intel professional. As a result, we have contributed to a number of "firsts" in the microelectronics industry. Now we're setting industry standards for single-board computers and supermicro systems, like our 286/310 - to date the most powerful we've ever made. When it comes to systems integration, we're out in front with our iDIS Database Information System. Our iTAPS Transaction Processing System handles up to 16 users and allows for the development of individual application software 50% faster.

We're an innovative company offering commitment and the opportunity to be involved in decision making and planning, while being able to create a significant industry impact. As an Intel engineer involved with **DATA COMMUNICATIONS, LOCAL**

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Data Processing Opportunities

Consider ITT Federal Electric Corporation for immediate career opportunities working on a major aerospace project. We're working at the frontiers of software and instrumentation technology in support of key programs vital to the national security. Join us at the **Air Force Western Space and Missile Center** and share our pleasant lifestyle in Santa Barbara County. We have the following professional positions immediately available.

Scientific Programmers/Systems Analysts

At all levels. Candidates with a BS in technical disciplines (Computer Science, Math, Engineering). Experience with DEC VAX 11/780, Gould/SEL 32/55/77, Cyber 170 or Perkins Elmer 3220 preferred. FORTRAN and/or Assembler Language experience desirable. Will participate in the development of real-time and non-real-time scientific systems in an interactive environment.

Real-Time Programmers/Analysts

Candidates with 6 or more years experience are needed in the development of a radar acquisition system. Requires experience with FORTRAN or Assembler Language using a tailored Gould/SEL 32/57/77 computer system. Extensive knowledge in system development and integration will be required, in particular, addressing hardware interfaces.

Computer Programming Evaluation

Experience with computer performance measurement and evaluation techniques with a broad knowledge of hardware/software engineering disciplines required. Working experience with FORTRAN or Assembler Language and digital hardware design desirable, as well as experience with Gould/SEL 32/55/75, Cyber 170/700 and VAX 11/780 computer series.

Digital Engineers

At all levels. Candidates with electronic engineering degree or in computer science desired. Experience in design, implementation and integration of microprocessor system in an environment of mainframe interface with microprocessor control and switching units. Will include hardware and firmware applications. Telemetry experience is desired.

Computer Engineers & Technicians

At all levels. Candidates needed to perform component level maintenance and repair on digital and analog equipment. Emphasis should be on maintenance of minicomputers and peripherals. Positions are available for maintenance of telemetry equipment. Engineering positions require a degree in a technical discipline.

Real-Time Operating System Developer

Candidates with experience in the development of a real-time software operating system are needed. The environment is a Cyber 170/700 series operating under NOS. Will perform design, implementation and integration activities. Required is a broad knowledge of an environment of hardware and software interfaces.

Senior Analysts IDMS DB/DC

The candidates we seek should have 8 or more years of DP experience including a minimum of 5 years with analysis, design and development of on-line information systems in an IBM, COBOL, data base (IDMS, IMS, TOTAL, etc.) environment. BS in Computer Science and COBOL programming experience using BSE/ICCF/VSAM or equivalent tools desirable. Experience with Cullinane's IDMS/DC and integrated data dictionary a plus.

The technical challenges are here, and so is an unbeatable quality of life. Come and experience it.

Or send your resume with salary history to: Tony Rodriguez, Employment Manager, Dept. CW 7/9, Federal Electric Corporation, P.O. Box 5728, Vandenberg Air Force Base, CA 93437.

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We are a 5 year old manufacturer of both hardware and software for financial institutions. Utilizing the latest in minicomputer based terminal systems, our product is designed to automate banking financial functions. We're well financed, well-organized and solidly on our way to industry leadership.

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You'll design systems and write programs for financial applications. To qualify, you must have 3-5 years experience in business applications, preferably financial (banking would be ideal), the ability to handle a DEC PDP 11 with RSX 11M Operating System, an understanding of Assembly language, and experience utilizing minicomputer assembler to design related software. Strong communications experience required. You should currently be working in an on-line real time multi-tasking environment. Good documentation skills would be a plus.

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You must have at least 3 years relevant experience, preferably in a financial environment, and be good at dealing with people.

If you're the progressive programmer analyst we're looking for, join an established DEC shop now adding IBM capabilities.

Once you join the Systeme team, you'll receive an excellent salary plus comprehensive benefits including relocation assistance. To apply, please send your resume in confidence to: Personnel Manager.



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Prog. Anal.	TO: \$32,000
(3 plus yrs. banking IMS & COBOL)	VA location
Sys. Prog.	TO: \$40,000
(3 plus yrs. NCP & VTAM)	NC location
Sys. Anal.	TO: \$37,000
(3 plus yrs. ins. appl. & COBOL)	TN location
Prog. Anal.	TO: \$28,000
(3 yrs. H-P & COBOL)	NC location

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Sys. Engrs. - Micro/Op. Sys.	TO: \$50,000
Sr. Software Engr. - VAX/VMS	TO: \$42,000
Software Engrs. - 80/86-88	TO: \$45,000
Software Engrs. - Telephony	TO: \$60,000

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Successful applicants must have a college degree or equivalent in the computer science field plus one to three years experience COBOL programming in OS/MVS, VSAM and CICS systems environments.

These positions offer rewarding challenges and an excellent compensation and benefits package. Candidates must be willing to relocate to Wichita, Kansas.

Do Not Call. If you are interested and would qualify, send salary history and resume to:

Cessna Aircraft Company
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Wichita, KS 67201

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At GROWMARK, expansion of our support team for minicomputer applications has created a need for an experienced DPS6 minicomputer specialist. This individual's responsibilities will include new development projects in addition to support of existing applications. Duties include system design, programming, operating system software support and new site installation. Current customer base includes Level 6 and DPS6 sites plus internal DPS6/10 microcomputers.

We are seeking an individual with advanced COBOL skills, MOD-400 Operating Systems software support skills and 4-6 years of direct DPS6 experience. Knowledge of DEF, Office Automation Software and communications would be desirable.

This position offers a competitive salary and benefit package in addition to a challenging assignment for an individual who wants to apply their DPS6 experience to this rapidly expanding project area. Candidates should send resume and salary requirements to:

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Computing Consultants, Salary \$23,601 - \$38,522. Consultants support academic and administrative users. Good communication skills required. Experience in higher education desired.

Several positions available in the above areas. For further information contact:

Tom Mueller, Director
Virginia Tech Computing Center
113 Burruss Hall
Blacksburg, VA 24061
703-961-5007

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Peripheral Systems Engineers; Digital Systems Design Engineers; Processor Microcode Specialists; Applications Software Consultants;
Technical Writers; Electrical Engineers; CMOS LSI Design Engineers; Microwave/Magnetics Engineers; UNIX/ADABAS Programmers;
Mechanical Engineers; Propulsion Engineers; Tool Design Engineers; Materials Engineers; Component Engineers; LSI Bi-Polar Engineers;
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Details on all the positions that you match— plus a description of
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All applicants will receive answers by return mail.

PLEASE PRINT CLEARLY IN THE SPACE PROVIDED FOR EACH ANSWER

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CITY _____ STATE _____ ZIP CODE _____

**TO PROTECT YOUR PRIVACY, YOU DO NOT HAVE TO PROVIDE THE NAME OF YOUR CURRENT EMPLOYER,
AND ONLY THE INFORMATION YOU PROVIDE BELOW WILL BE USED FOR COMPUTER-MATCHING.
IF YOU DECIDE NOT TO ACCEPT THE POSITIONS THAT ARE OFFERED TO YOU, YOUR IDENTITY WILL NOT BE REVEALED.**

ASKING SALARY: (YOU WILL BE MATCHED AGAINST JOBS PAYING THIS AMOUNT OR MORE PER YEAR) \$ _____

RELOCATE: ☐ YES ☐ NO ☐ LOCATION PREFERENCES _____

EDUCATION: DEGREE(S) _____ YEAR(S) _____ MAJOR(S) _____ SCHOOL(S) _____

PRIMARY OCCUPATION: (For example, Finance, Engineering, etc.) _____ NUMBER OF YEARS _____

CURRENT JOB TITLE _____ CURRENT INDUSTRY _____

CURRENT JOB RESPONSIBILITIES _____

SPECIAL SKILLS: (For example, Foreign Language: CPA; FORTRAN; S.E.C., etc.) _____

GENERAL DESCRIPTION OF CURRENT EMPLOYER (For example, Major Manufacturer; Small Engineering Firm; etc.) _____

PREVIOUS EMPLOYER: (1) Company Name _____ DATE: (Month & Year) From _____ To _____

PREVIOUS JOB TITLE/RESPONSIBILITIES _____

PREVIOUS EMPLOYER: (2) Company Name _____ DATE: (Month & Year) From _____ To _____

PREVIOUS JOB TITLE/RESPONSIBILITIES _____

STATEMENT OF CAREER GOALS: _____

HOW SOON COULD YOU START A NEW POSITION? ☐ IMMEDIATELY ☐ 60 DAYS ☐ OTHER _____

I CERTIFY THAT THIS SUMMARY REPRESENTS MY PERSONAL EXPERIENCE AND INTEREST

W0434

SIGNATURE _____ DATE _____

Mail your application before August 30, 1984 to Mr. Dale H. Learn, at:

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NEW ORLEANS—home of the 1984 World's Fair—is also the home of Middle South Services, Inc., the Service Company of the Middle South Utilities System. We offer challenging career opportunities with one of the South's largest Utilities.

ENVIRONMENT consists of IBM 3084, 3081, and 4341 supporting large scale IMS development projects, scientific and business applications.

PROJECT LEADERS

- Position involves Financial development efforts emphasizing strong background in project management. IMS DB/DC experience is a plus.
- Responsible for design and review of physical data bases, design in-house or outside packages. Strong IMS concept background with proven administrative abilities.

SR. SYSTEMS ANALYSTS

- Responsible for system design and User Interface. Prefer large scale IMS DB/DC development and design experience.
- Development of on-line Logical Data Base Design and Information System Planning.

SR. ANALYST/PROGRAMMERS

- Positions require previous programming experience on business or scientific applications utilizing COBOL, PL1 and/or Fortran. IMS DB/DC experience required for large development projects. Exposure to VM Operating System background with proven administrative abilities.

DATA BASE ANALYST

- Thorough knowledge of IMS concepts is required. Experience in performing DBD, PSB, ACB and MFS gens. Must provide support for IMS Internals, System Tuning and Dump Analysis.

SYSTEMS PROGRAMMERS

- (IMS or MVS) Responsible for New Release Installation, Problem Resolutions and System Tuning. Experience in IMS, DB/DC or MVS Operating Systems.
- Responsible for CICS Internals including TABLE GENS—SYSGENS, Performance/Tuning, MVS Dump Analysis and Problem Determination.

PLANNING ANALYST

- Requires a background in H/S capabilities, Applications Development and Analysis, Equipment Evaluation and Computer Cost Studies.

NETWORK SYSTEMS ANALYST

- Responsibilities include Module Problem Determination and Preparation of programs for Line Transmission. Requires knowledge of BASIC, VTAM, IMS or CICS, plus Systems Programming experience in a Telecommunications Environment.

MIDDLE SOUTH offers an exceptional Relocation package including:

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We offer an excellent benefits Program and Compensation Package.

For more information contact Gary Silbert or Byron Heath:

1-800-231-4481

In Louisiana, call Collect (504) 569-4951 or send resume.



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Engineers

RCA Missile and Surface Radar in Moorestown, New Jersey, is on the leading edge of Military Electronics in the creative application of the latest State-Of-The-Art technology. Challenging opportunities exist in the areas of hardware and software systems development for experienced degreed engineers.

Software System Engineers - (FAA program)

Candidates will provide technical guidance to the FAA in test and integration of ATC systems and in specification evaluation and acquisition of ATC for the Host Computer System and the Advanced Automation System. Experience in Radar Systems, Communications, Display Systems, or Air Traffic Control required.

Software Design Engineers

Candidates will be responsible for the specification, design, hardware/software integration and test of large real-time embedded Command and Control weapon systems. Familiarity with various military weapon systems, especially Navy systems, desired.

Undersea Warfare Software Design Engineers

Candidates will be responsible for the design and development of real-time acoustic signal processing software/firmware for Underwater Weapon Systems.

We are located in Moorestown, New Jersey, an ideal suburb just 15 miles outside of Philadelphia, and close to the shore and mountains. We offer excellent starting salaries and a comprehensive benefits program.

Please submit resume, including salary history to:

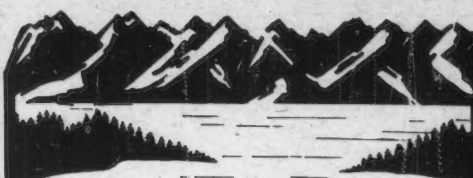
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Bldg. 108-111
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RCA



We Employ People Who Employ Ideas.



PROGRAMMER ANALYSTS

Reno, Nevada

Data Processing opportunities in the Biggest Little City in the World are few and far between. Employment with Sierra Pacific Power, Northern Nevada's largest D.P. employer, would allow you to maximize professional growth while enjoying the type of low congestion - low crime - outdoor family lifestyle found only in a Sierra Nevada recreational area like Reno. If that's not enough, we're only 45 minutes from the ski lifts and aquarium-clear water of world famous Lake Tahoe.

The successful candidates for the positions we have open will use their professional skills in COBOL and CICS in support of corporate applications in Engineering, Customer Support, General Accounting and more.

Our environment features an IBM 3083 and two IBM 3031's under operating systems; MVS and VM/CMS. Ideal candidates for our current openings will be degreed and have 3-5 years of business programming experience.

In addition to moving expenses and present mortgage payment assistance, we're offering a top salary and benefit package. CALL TODAY (702) 789-4731, or submit resume to:

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SIERRA PACIFIC POWER COMPANY

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CICS SYSTEMS PROGRAMMER

Major S.E. corporation headquartered in Atlanta and affiliated with Alabama, Georgia, Gulf and Mississippi power companies, has the following position available:

CICS SYSTEMS PROGRAMMER

- Experienced with BAL and CICS internals
- Install and maintain CICS
- Performance measurement and tuning
- Knowledge of SMP and problem determination

We offer competitive salaries and excellent benefits package. Please forward resume with salary history, in confidence, to:

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(603) 669-2011

200 Clarendon Street
Boston, Mass. 02116
(617) 247-6800

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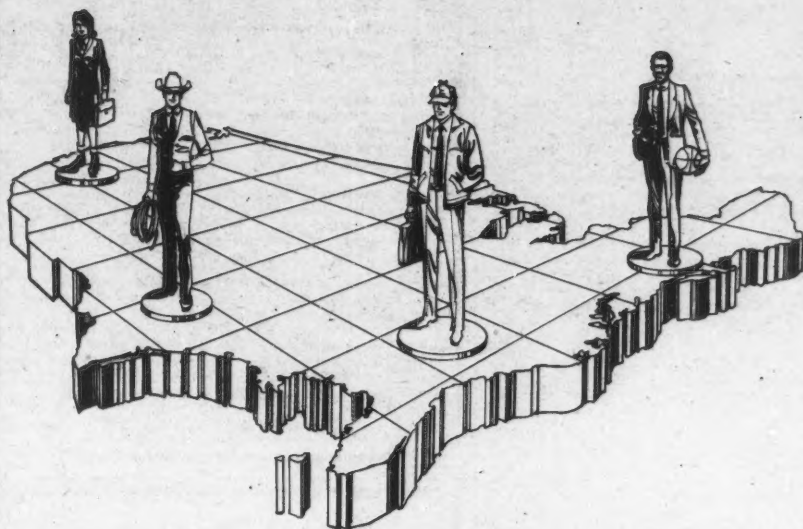
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LIFE AT DATA GENERAL



For development engineers, we have excitement all over the map. Just pick a direction, and GO!

Life at Data General has excitement of all kinds. There's the overall sensation of being in a Fortune 400 company well on its way to 300. And there's the competitive pleasure of winning the industry's hotly-contested contracts. For people on development projects, the excitement is a special kind. It comes from getting really wound up in a problem, with a small, close-knit group, solving it in a remarkably short time, and seeing the solution go out the door in a Data General product.

If you'd like to get that excitement into your career, we have openings in a variety of such development teams. Here's a breakout, partly technological, partly geographical:

MASSACHUSETTS

At our corporate headquarters in Westboro, CPU teams are working on follow-ups to our successes with MV 10000, MV 8000C, and DESKTOP GENERATION™. Peripheral teams, emphasizing mass storage, are into major efforts in communications and text and graphics manipulations, looking forward to office automation and industrial automation products.

For more information, here's who to contact: Hardware Development: Emily Atkinson; Mass Storage Development: Steve Grossman. Both are at Data General Corporation, 4400 Computer Drive, Westboro, MA 01580.

NORTH CAROLINA

At Research Triangle Park, there's exciting development work in—UNIX* at all levels, operating systems based on multiple microprocessors, new communications protocols, Relational DBMS, artificial intelligence, and advanced tools in software engineering.

For more information, contact: John Bushfield, Data General Corporation, 62 TW Alexander Drive, Research Triangle Park, NC 27709.

TEXAS

The excitement here in Austin is about peripherals, and the work is on graphics software, and terminal and printer development using the new imaging technologies, voice/data integration, and exploration of all the printer technologies. The city is one of the fastest-growing in America, filling up with interesting new people.

To join them, send your resume to: Steve Grossman, Data General Corporation, 2706 Montopolis Drive, Austin, TX 78741.

CALIFORNIA

Our semiconductor division in Sunnyvale is pursuing its long-term commitment to new development in VLSI, with major projects in our unique custom chips, and very high-speed gate array as well as other random logic. Much of this work is preparing for our next-generation superminis, which also involves process development and CMOS, Bipolar and NMOS technologies.

For more information, send your resume to: Fred Staudmyer, Data General Corporation, 433 North Mathilda Avenue, Sunnyvale, CA 94089.

*Trademark of AT&T Bell Laboratories

If none of these directions is right for you, technologically or geographically, there's more exciting life at Data General—for sales professionals, systems and field engineers, manufacturing and marketing experts—across the country. If you're interested, send your resume to our Westboro Corporate Headquarters.

Investing in people to make equal opportunity employment a reality.

Data General
careers a generation ahead.

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SALES & SYSTEMS ENGINEERING OPPORTUNITIES

Atlanta, Denver, Houston, San Jose, Toronto

Take the next step with Sytek...into a momentum envied by the industry in which we provide communications systems solutions in networking technology.

As the acknowledged leader in broadband Local Area Networks (LANs), Sytek continues to set the pace in next generation product development in commercial, government & industrial Local Area Networks. Make an impact in this momentum with one of these key NEW opportunities:

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The timing's never been better for technically strong, high energy sales professionals who can "land on their feet running" in our dynamic growth momentum. Set the direction to establish and expand your sales territory, maintaining an established client base and focusing on new business development. If you've got 5+ years related experience and a proven track record in the data processing/data communications/telecommunications industries, including territory management responsibility, are at ease and articulate in selling to top management and can work smoothly as a key contributor, we'd like to talk to you now. (Refer to Mail Stop OSR)

SYSTEMS SALES ENGINEERS

Tackle key technical challenge with responsibility for pre-sales support, working at customer sites on in-depth technical presentations and consulting efforts and be involved in proposal preparation, trade shows and technical seminars. You should be able to work independently within a team setting with a zest for identifying new uses/applications and competitive product analysis in the Local Area Network environment. At least several years experience in the technical aspects of the data communications or computer industry with strong interest in expanding your skills and experience in our rapid growth arena required. Broadband LANs knowledge would be a definite plus. Flexibility for travel a must. Two opportunities also exist to support International Sales which will require travel abroad but will be based at our Mt. View, CA Corporate Headquarters. (Refer to Mail Stop OSJ)

Going to NCC in Las Vegas?
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Call Jeff Tonkel, Director of Technical Support, COLLECT at
415/966-7353

to discuss these opportunities
& schedule an interview during NCC.

(Or leave a message for him or
Ofelia Santillana during NCC —
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Your rewards are exceptional — including an innovative compensation package coupled with industry competitive salaries AND relocation assistance. Sales management positions are based on salary plus incentives. If we miss you at NCC, please send resume with salary history to Ofelia Santillana, Manager/Human Resources, referring to Mail Stop Number, Sytek, Inc., 1225 Charleston Road, Mountain View, CA 94043, (415) 966-7300. We are an equal opportunity employer. Principals only, please.

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Manager, Manufacturing Systems

- 8+ years in development, implementation, and modification of manufacturing systems in an electronics environment
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- Demonstrated ability to work with MRP systems (AS/400, DEC, and IBM) is strongly desired
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MICOM SYSTEMS offers a generous compensation/benefits package, stock option and a substantial cash bonus provided. Join the innovative technical team at MICOM. Please send resume or call Herb Deltz, MICOM SYSTEMS, INC., 20120 Plummer St., Chatsworth, CA 91311. (818) 998-8844. Equal Opportunity Employer

MICOM

Data Processing

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(Telecommunications)

Our San Francisco Peninsula client is expanding their Data Center Staff to include 2 Systems Professionals in support of a new telecommunications project.

These positions require IBM Mainframe and SNA/VTAM exp. in an MVS setting with exposure to IBM/PCs and intelligent work stations distributed to a variety of remote locations.

This is a unique opportunity to lead the software and planning components of a start-up effort in an extraordinary company. The benefits are unusual, the setting stimulating, and the technical challenge will be satisfying.

We have been exclusively retained to find people with human values who are motivated to work in an environment that is conducive to teamwork and personal fulfillment.

Please send resume, or call, in confidence, to Dick Mata, Sr. Managing Consultant, Professionals for Computing, Inc. (Search & Personnel Services), One Maritime Plaza, Ste. 1350, San Francisco, CA 94111. (415) 956-7120. Employer assumes fee.

professionals
for computing, Inc.

Data Processing Professionals Employee Systems

Join the team of professionals at Denny's Inc. Information Services Department and you'll be involved with exciting and challenging assignments in our on-line (CICS) and data base (IMS) systems. We're looking for top professionals to support our future growth and ensure quality Human Resource Systems to the Personnel, Payroll and Benefits Departments within our multi-divisional environment. Consider these current openings:

SR. SYSTEMS ANALYST

You'll need 5+ years experience on IBM OS/MVS and COBOL in the development, enhancement and maintenance of on-line systems using CICS, IMS data base design and structured design/programming techniques.

We require strong technical ability (JCL, TSO/SPF, COBOL, CICS, IMS), project leadership and excellent communication skills. Prior experience in Personnel/Payroll and FOCUS desired, but not mandatory. BA/BS degree or equivalent experience helpful.

PROGRAMMERS/ANALYSTS

These programming positions require a minimum of 2 years experience with structured design/programming techniques utilizing COBOL, JCL, TSO/SPF on IBM OS/MVS systems including on-line using CICS/DL1. Prior experience in Payroll/Personnel and FOCUS desired, but not required. BA/BS degree or equivalent experience helpful.

Denny's Inc. maintains one of the most sophisticated Information Services Departments in the industry, ensuring excellent career development. In addition, we offer competitive salaries and outstanding benefits, soon to include a 401k plan. For immediate consideration, please forward your resume with salary history to: Jackie Lopez, Denny's Inc., Dept. CW-78, 16700 Valley View Ave., La Mirada, CA 90637. We are an equal opportunity employer m/f.

Denny's Inc.

CICS OM/MVS	IMS SYSTEMS PROGRAMMERS SYSTEMS PROGRAMMERS SYSTEMS PROGRAMMERS MVS/XA	VM DOS/VSE
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The technical skills most in demand in today's active market are systems programming and performance tuning. While this lasts, you can almost choose the industry/location combination you wish. We have openings with excellent client companies from Mass. to Calif. as far north or south as you wish. All fees and expenses are paid by the companies. NEVER A CHARGE TO YOU. IF YOU ARE EVEN THINKING OF A CHANGE, PLEASE CONTACT US!

Sample Openings

CICS Perl Tuning, FL, TN, 32K; Data Base Adm, CA or KS, 35K; MVS/XA Sys Prog, FL, 40K; CICS or IMS Sys Prog, SC, 38K; MVS Sys Prog, KY, CA, 35K; DB Design, LA, 40K; PSB-PDB Gens, TX, 42K; VM Sys Prog, CA, FL, 42K.

Please send your resume IN CONFIDENCE, or call collect:



"Steve" Stevenson, Partner

Jim King and Associates

1840 Gulf Life Tower/Jacksonville, FL
(904) 398-KING

BANKING - HOGAN EDP CONSULTANTS

Expanding practice offers excellent opportunities for highly motivated financial industry EDP professionals with hands-on experience in implementing the HOGAN transaction system. Specific areas of interest are:

Project Planning
Application Analysis
Software Installation
Conversion Programming
System Acceptance
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Industry experience required. Consulting experience preferred. High visibility, key leadership opportunity. Prime Southeastern location. Results oriented individuals should send their resumes and requirements in confidence to Kay DeVore at Box C, One NCNB Plaza, Suite 3200, Charlotte, North Carolina 28280.

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Fresh Challenges

amdahl

In October, 1970, a company was formed expressly to build one product: a mainframe computer that would outperform the mainframe that owned the market at that time. The Amdahl phenomenon was born.

Today, we're a total systems supplier, with sales in excess of \$750 million, and a member of the Fortune 500. The phenomenon continues.

A growing part of the Amdahl Phenomenon is "Amdahl U," which provides an extensive curriculum of courses, programs and seminars covering large-scale central site operations. In fact, Amdahl Education is so well known for its quality that we've become one of the largest systems software educators in the world.

Because of our continuing growth and diversification into related product lines, we are expanding our Education function and adding to our roster of classes. We have a critical need for instructors to provide practical, real-world, hands-on instruction in these areas:

HARDWARE

Hardware Instructor

Responsible for CPU course development and presentation to Field Engineering Specialists. Requires strong large-scale CPU technical background; leadership skills a plus. Training experience desirable but not mandatory.

COMMUNICATIONS

Staff Instructor

Develop and conduct courses in the teleprocessing curriculum to include network planning, network problem determination, NCP and VTAM. Requires 5+ years internal knowledge of VTAM and NCP systems and the SNA environment.

Sr. Instructor

Responsible for the planning, scheduling, quality control, project development, and delivery of hardware training classes for communications products. Requires in-depth hardware/software technical experience with X.25 technology. Training experience desirable but not mandatory.

SOFTWARE

Software Instructor

Develop courses for 580 software. You'll be responsible for both lecture and lab. Requires a minimum of 6 years industry experience; strong operating systems knowledge, preferably UNIX*, VM or MVS; and good leadership skills. Training experience desirable but not mandatory.

*UNIX is a trademark of AT&T Bell Labs.

INSTRUCTIONAL SYSTEMS DESIGN

Course Designer

Design and oversee production of ISD products. Requires a BS degree or equivalent, and a background in analyzing, designing, producing and validating courseware utilizing ISD formatted training.

Course Writer

Write scripts and tests for ISD courses. Must be familiar with DP terminology and instructional design processes.

Similar positions are also available at field locations throughout the United States.

If you're a specialist in one of these areas and welcome fresh challenges, let's talk. Call Kim Hawley TOLL FREE at 800-538-8460, extension 7171 (in California, call COLLECT 408/746-7171). Or send your resume to her attention, Amdahl Corporation, Dept. 7-B, MS-300, P.O. Box 3470, Sunnyvale, CA 94088. We are an equal opportunity employer through affirmative action.

the amdahl phenomenon

Applications Programmer

Writes micro and mainframe software; develops programs and debugs applications running under MS-DOS, CMS, and MVS. Also creates EXE files, EXEC files, XEDIT files and other command files. Must be able and willing to work in a wide variety of academic areas from religion to civil engineering and must be literate and skillful enough to produce good first level documentation. Must be organized; interface with both technical and non-technical people, and have technical (programming and design) skills. Experience with IBM PC's, IBM mainframes (3xxx or 4xxx series), MS-DOS, VM, CMS, MVS, and a language such as FORTRAN, PL/1, or PASCAL essential. Knowledge of JCL, EXEC-2, REXX, APL, graphics, statistics text processing packages, and other micro based software helpful.

File Server Systems Programmer

Designs, implements, and supports a network system of IBM 43XX computers to facilitate the archiving, back-up, spooling, and transfer of files among a collection of various IBM Personal Computers, hardcopy output devices, and host computers. Requires knowledge of IBM370 assembler language, VM-370, RSCS Networking, PC DOS, VM/PC, and ASCII printer and plotter software. Familiarity with ASCII, Bisync, SNA, and TCP/IP protocols helpful.

Applications Support Person

Installs, tests, and packages PUCS written and vendor supplied software. Evaluates new software packages and recommends new packages and new features as needed. Strong skills in understanding and designing software with good user interfaces essential. Must have understanding of the capabilities of micro and mainframe computers and an indepth knowledge of the packages that are available for them. Understanding of file design, databases, graphics, and distributed data processing essential. Works with faculty members and system programmers.

Please send resume including salary history and requirements to: MR. JOHN R. PIGGOTT, COMPUTER CENTER, 87 PROSPECT AVENUE...

Princeton University

PRINCETON, NEW JERSEY 08544

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DATA BASE ADMINISTRATOR AUBURN UNIVERSITY

The Division of University Computing is now accepting applications for a Data Base Administrator. Responsibilities include planning, designing and implementing data base systems. Monitoring, tuning, backup and recovery of data bases. Developing standards and procedures. Insuring the integrity and security of the system. Assisting the application development staff and developing the integrated system utilizing data base techniques. Providing general training and assistance to the users of the system throughout the university.

Qualifications: bachelor's degree required with master's degree desirable. Three to five years experience as a Data Base Administrator preferably with a major data base management system in a university environment. Must have excellent communication skills and the ability to effectively interact with all levels of management.

Auburn University is a state supported land grant institution and the largest university in the state of Alabama. The institution is a comprehensive research oriented university with strong areas of concentration in agriculturally related sciences, natural sciences, all fields of engineering and many other disciplines. The university is located in a small urban community of about 60,000 total residents. Located within the area are excellent recreational and social opportunities.

Send a letter of application and a current resume to:

William Max Ivey, Director
Division of University Computing
144 Parker Hall
Auburn University, AL 36849

Application deadline July 31, 1984. Auburn University is an Equal Opportunity Employer.

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The Naval Weapons Center, the Navy's major Research, Development, Test and Evaluation Activity located at the foot of the Sierra Nevada, is seeking experienced software professionals to join its Aircraft Software Product Assurance Team.

Part of the Center's mission is to develop new software and software revisions for in-service aircraft, and test and validate the software of developmental aircraft.

We are looking for candidates with BS or advanced degrees in engineering, computer science, math or other appropriate disciplines, who are interested in working with software support activities for front-line Navy/Marine Corps tactical aircraft, including the AH-1J/T, A-4M, A-6E, A-7E, AV-8B and F/A-18.

Those with experience in the following areas should apply:

- Software Quality Assurance
- Knowledge of Applicable Standards
- Software Quality Testing
- Modern Software Engineering Practices
- Structured Programming
- Real-Time Systems
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SALARY TO \$45,000

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COMPUTER EXPERTS - SAUDI ARABIA

The Ministry of Foreign Affairs in the Kingdom of Saudi Arabia has open positions for the following computer experts. Speaking of Arabic language is a plus.

1. DATA ADMINISTRATOR AND MIS ADVISOR

QUALIFICATIONS:

Post graduate university degree in information system/computer science.

EXPERIENCE:

Five years of abroad experience in DP and management of DP center. Wide experience in electronic data processing, data base analysis and usage.

2. MANAGER - APPLICATION DEVELOPMENT AND MAINTENANCE

QUALIFICATIONS:

B.S. or higher degree in computer science, more than 5 years experience.

BASIC FUNCTION AND RESPONSIBILITY:

Supervise the data base systems and programming group design and implement all systems development for the ministry. Supervise the design and installation of major revisions to existing applications and maintenance of the procedures manuals and forms controls. Responsible for coordination of the systems programmers.

3. SENIOR SYSTEMS PROGRAMMER

QUALIFICATIONS:

B.S. in computer science.

EXPERIENCE:

5-8 years experience and a track record in performing duties in MVS on IBM machine. Must be excellent COBOL and Assembler programmer. Knowledgeable in MVS control flow and control blocks. Two years supervisory experience and experience in capacity analysis, and minimum 3 years experience in VTAM CICS JES2.

4. SYSTEMS ANALYSTS

QUALIFICATIONS:

B.Sc. in computer science or equivalent.

EXPERIENCE:

4-6 years in computer related project management on line, systems design application programming and job control language. Experience in data base analysis, programming in COBOL and Assembler, experience in IBM mainframes and MVS (TSO). Bilingual in Arabic and English is a plus.

5. SYSTEMS PROGRAMMER

QUALIFICATIONS:

B.S. computer science or equivalent.

EXPERIENCE:

More than three years in IBM's, MVS, CICS as software programmer. Specialization in BASIC software an asset.

5. DATA BASE ADMINISTRATOR

QUALIFICATION:

Masters degree or equivalent in computer science.

EXPERIENCE:

5 years current experience in DB especially in business application development on IBM mainframes, minimum three years in EDP (Electronic Data Processing) and as DBA in an IMS environment and a proven track record in developing major data base systems. Programming expertise in COBOL and PL/I-MVS, experience in personal skills and ability to train DP staff and develop users community relationships.

7. DATA COMMUNICATION

QUALIFICATIONS:

B.S. or master in computer science or electrical, electronic or communication english.

EXPERIENCE:

7 years minimum in communication field in an IBM mainframe environment especially (ACF, VTAM, ACF/NCP, SAME, TSO, RACF, CICS). Extensive technical experience in SNA communication controls of the 3705, 3725 type and in protocols such as SDLC bsync and asynch.

8. DOCUMENTATION AND TRAINING EXPERT

QUALIFICATIONS:

M.Cs. in information science/library science or equivalent. Diploma in computer science.

EXPERIENCE:

Ten years minimum in subject analysis, development or subject headings, part of this experience should be on a computerized documentation system. Experience of training professional and non professional staff in expertise area. Excellent knowledge of English and good knowledge of Arabic. Experience of computers programming and/or systems analysis is desirable.

9. SENIOR COMPUTER OPERATOR

QUALIFICATIONS:

B.A. or higher degree in communications engineering, electronics or engineering.

EXPERIENCE:

5-8 years in IBM machines particularly under IBM MVS operating system and CICS monitor, terminal oriented micrographic, systems, communication systems operations, communications access method and line control techniques, minimum three years supervisory experience.

10. PROGRAMMERS

QUALIFICATIONS:

B.S. in computer science/information systems or B.A. in business with concentration in DP.

EXPERIENCE:

At least 3 years experience in designing and testing programs associated with the development of new systems and the maintenance of existing applications. Proven knowledge of COBOL and PL/I - IBM mainframes and MVS, TSO level experience. CICS, IMS experience is a plus.

The Ministry offers good salary and fringe benefits commensurate with the academic qualifications and experience.

Interested candidates please send curriculum vitae with address and phone number to:

Saudi Employment Office
1101 Vermont Avenue, NW
Suite 501
Washington, D.C. 20005

Arizona/California/Texas/Colorado/Florida/Boston
SCIENTIFIC OR BUSINESS PROGRAMMERS

All fees and relocation paid.

\$20-40,000

If you have a BSEE, BSCE, BS in Mathematics or Physics or equivalent, we need you right now.

For Business: OS/DOS/IMS/CICS/MVS/JES Prog/Anal/Systems/Data Base. All large scale installations.

For Scientific: experience in the computer, communications, semiconductor, or aerospace/defense industries.

Your name, resume, and present employer will not be given out without your permission.

For sincere personal service, please send a confidential resume to:

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PULLMAN PERSONNEL

3033 North Central Ave., Suite 505, Phoenix, Arizona 85012

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FINANCIAL SERVICES
DEPARTMENT
CITY OF CORVALLIS, OREGON
DATA PROCESSING
PROGRAM MANAGER

Full-Time Position

\$2,341 - \$3,167 per month

The City of Corvallis, located in the Willamette Valley, has a career opportunity for a Data Processing professional.

The Data Processing Program Manager reports to the Financial Services Manager and is generally responsible for the management of data processing services. Key areas of responsibility include planning for the appropriate use of computer technology in a shared, on-line environment; the preparation and support of the organization for growth and change related to data processing; and participation on the Financial Services Department Management Team.

Applicants must have management skills and knowledge of financial services principles; experience managing change in a diverse organization; at least 2 years of specialized training in data processing; and 5 years of related experience in a user-oriented environment. 2 years of which must have been in a supervisory capacity or an equivalent combination of education and experience.

Address inquiries, resumes, or applications to the City of Corvallis, Financial Services Department, 180 N.W. Fifth Street, P.O. Box 1982, Corvallis, OR 97330-1982, telephone 503/787-4848, no later than August 10, 1984.

AN EQUAL EMPLOYMENT OPPORTUNITY/AFFIRMATIVE ACTION EMPLOYER

VAX SYSTEMS SPECIALIST

Denison University is seeking a VAX Systems Specialist to provide overall technical support and guidance for dual VAX systems in a clustered environment. This challenging position requires a BS in Computer Science or related degree (MS preferred) in-depth knowledge as VMS Systems Programmer/Manager and multiple language skills required to support SPARC, MicroVAX, VAX, CICS, COBOL, BASIC, PASCAL, FORTRAN, APL, etc. FMS, RDB and Databases.

Successful candidate will be a self-starter with excellent problem solving and communications skills. Responsibilities include overall systems support and design including networking, performance optimization, job accounting, selection and installation of systems software and hardware.

Denison is a quality undergraduate, liberal arts college located in the attractive Village of Granville, Ohio, approximately 25 miles from Columbus. Denison has a strong commitment to academic and administrative computing and operates a 780 computing system, soon to be supplemented by a 785. Competitive salary and staff benefit program.

Please send resume, including references and salary requirements, to:

Kathryn Lages
Director of Computer Center
Denison University
Granville, OH 43023

Reply by August 1, 1984.

Equal opportunity/affirmative action employer

PROGRAMMER ANALYST
SYSTEM 38

SNYDER'S OF HANOVER, a progressive company in south central Pennsylvania needs an experienced Programmer/Analyst to complement its growing state-of-the-art Data Processing Department. Successful candidate will have 1 or more years "hands on" System 38 experience and 3 or more years Data Processing applications development. RPG and COBOL necessary. We offer competitive salary and full line of benefits. Please send resume and salary requirements to:

SNYDER'S OF HANOVER, INC.
Industrial Relations Manager
P.O. Box 471
Hanover, PA 17331

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We have specialized in data processing professional placement in Maine for almost a fifth of a century. If you qualify for positions in the \$25-40,000 range, please contact us in total confidence. Our clients pay our fees and provide relocation assistance.

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BAL PROGRAMMERS

We're currently seeking programmers who have IBM Assembler Language experience. Initially you will complete a training program in ACP/PARS for our reservations system. Programmers with BAL experience learn ACP/PARS quickly and look forward to a rewarding and successful career.

ACP/PARS PROGRAMMERS

An ideal career environment awaits ACP/PARS programmers. Eastern operates one of the most advanced computer systems having 3 IBM 9083's and 5 IBM 3033's. Our real time network serves approximately 20,000 online terminals.

Eastern offers excellent short term career growth opportunity, company paid dental, medical, life and retirement insurance, relocation reimbursement and outstanding worldwide travel discounts. Living in Florida offers a sun filled casual outdoor lifestyle with no state income tax.

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TeleVideo has combined the best of both minicomputer and microcomputer worlds with our new Personal Mini™. This new multi-user system, based on distributed processing architecture, supports IBM PC, PC compatibles and PC-DOS applications. We're continuing our trend of engineering excellence, and we have an opportunity for a talented software professional to get in on the ground floor of our next multi-user system.

Sr. Software Engineer
Project Leader — UNIX*

Your UNIX background will be essential as you develop system programs from product specs and proposals through program integration and test, working closely with both Marketing and Engineering. To qualify, you must have a BSEE/CS and 5+ years experience in operating systems development for minis/micros.

TeleVideo offers an excellent benefits package, including cash profit sharing. Send your resume to TeleVideo Systems, Inc., Dept. TD, 1170 Morse Avenue, P.O. Box 3568, Sunnyvale, CA 94088. We are an equal opportunity employer.

*UNIX is a registered trademark of AT&T Bell Labs.

TeleVideo Systems, Inc.

ACTUARIAL COMPUTER PROGRAMMING—Must be able to program pension plan actuarial calculations, assemble and classify statistics following prescribed procedures. Must be able to compute statistical data according to formulas, using computer. Must compile actuarial statistics charts and graphs. Must be proficient in computer skills, including programming: COBOL, application, FORTRAN programming languages and interpret or compile techniques. Must also be able to certify pension plan contributing, utilizing computer knowledge and background.

40 Hour Work Week—Monday thru Friday 9:00 a.m. to 5:00 p.m.

SALARY—\$308.00 Weekly—Must possess B.A. or B.S. degree in Computer Science.

To apply: Contact

STATE OF FLORIDA JOB SERVICE

FLORIDA STATE EMPLOYMENT SERVICE

1350 N.W. 12th Avenue, Room 280

Miami, Florida 33138

Please refer to job order #3728294

S/38
DALLAS
PROGRAMMER ANALYST

Fast growing multi-company, the leader in its industry seeks professional with 5 years programming experience. We need an intelligent individual who will utilize their development of interactive software. You must thrive on new challenges and withstand a fast exciting pace of automation. RPG program experience is required on S/36 or S/38. We have a large S/38 with 15 remote locations and expanding. We offer attractive benefits package (health, dental, life and profit sharing). New office located in downtown Dallas. Salary range \$30,000 - \$40,000. Please send resume and salary history in confidence to:

Director of Information Systems

P.O. Box 5895

Richardson, TX 75080

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Programmer/Analysts

-Boise, Idaho-
Systems Analysts
-Pocatello, Idaho-

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Candidates must have a BABS in Business or Computer Science and 3-5 years experience in COBOL. Systems Analysts must have 3-5 years systems analysis experience in a business applications environment.

If your career objectives include a challenge in a fast-paced Corporation...and your personal plans include living in a beautiful area close to outdoor recreational activities and affordable housing, please direct your resume and salary history as follows:

Systems Analysts:

Employment Manager
P. O. Box 912
Pocatello, Idaho 83201

Programmer Analysts:

Employment Manager
P. O. Box 27
Boise, Idaho 83707
(208) 336-2110

We are an equal opportunity employer. No agencies, please.

Simplot

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* San Diego *

ITS is a leading manufacturer of microprocessor based point-of-sale terminals and real-time transactional processing systems. We are currently expanding our software development capabilities and are seeking professionals to participate in this growth.

Several positions are available for programmers with experience in microprocessors with Assembly language or mini-computer applications using high-level and Assembly languages. You will be working in a team environment on projects which require a variety of responsibility.

Typical duties will include system definition, system and module design, coding, testing, documentation, installation and customer training. International travel opportunities are also available.

ITS offers an excellent salary and benefit package. Please forward your resume to Personnel:

INTERNATIONAL TOTALIZER SYSTEMS, INC.

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Robert Half, staffed by EDP professionals for EDP professionals with 80 offices throughout the U.S., Canada & Great Britain, is the largest network of personnel consultants in the Data Processing field. And the establishment in 1948 also makes Robert Half the oldest. One call and you can search the local, national and international markets. ALL FEES ARE PAID BY CLIENT COMPANIES, OF COURSE. The following is a partial listing of opportunities and locations.

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Excellent growth position with growth company. IBM large-scale, COBOL, CICS, Financial Applications. Start \$30,000

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(505) 884-4557

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At least 1 yr exp with MVS Internals, JES 2 and SMP 4. Roscoe & Panvallet are pluses. This position offers a great deal of flexibility to learn and expand your career. Salary to \$35,000 plus benefits.

PROGRAMMER/ANALYST
MS or PhD plus 5 yrs Fortran programming exp required. DEC/VAX exp is a plus but not necessary. This company offers choice of project when possible and the ability to experiment and design virtually.

Salary to \$45,000 plus

SYSTEMS PROGRAMMER

5 plus yrs exp in life insurance field as a programmer or analyst life 70 or life com are big pluses. OS/MVS COBOL shop. Company offers a nice rural location in one of the fastest growing cities in the country.

Salary to \$40,000

ROBERT HALF
of Austin, Inc.
400 E. Anderson #334
Austin, TX 78752
(512) 835-0883

SEATTLE

DATA BASE CONSULTANT

Major consulting firm seeks individual with extensive experience in data base on a variety of minis: DEC, HP, WANG, etc. Must be experienced with tools and programming facilities. Must understand physical limitations on those systems and how to optimize their performance. Also need good communication skills. \$DOE

Marjorie Peterson
ROBERT HALF
of Seattle, Inc.
600 University St., #2328
Seattle, WA 98101
(206) 624-9000

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Positions in retail & mfg. Genuine supervisory opps or fast-track to supervisor! Involves design, development & maintenance of corporate systems at well-known LOCALLY-headquartered firms. 2 yrs "hands-on" experience with S/38 required. To Low \$30's

Mark David
or Tim Smith
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3636 IDS Center
Minneapolis, MN 55402
(612) 339-9001

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Exciting oppy. Nat'l svcs co seeks polished appr prdr. You'll guide develop grp in IBM 3081 OS/MVS/IMS DB-DC COBOL shop. Technically challenging pos w/hvy user contact. Outstanding benefit pkg. \$40,000

MFG SYS ANALYST

Not progressing fast enough in your current job? This growing hi-tech mfr seeks polished analyst for new mfg apps develop proj. Diverse environ incl IBM OS mainframes + minis & PCs. Super oppy to enhance your tech & apps bkgrd. \$38,000

FOCUS SYS ANALYST

Dynmic fin'l svcs co seeks strong analyst to develop new sys for user depts. State-of-the-art IBM VM/CMS, FOCUS, PCs & LOTUS technology. Fast-paced hi-vis pos w/oply to manage people & project resources. \$32,000

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100 Summer Street
Boston, MA 02110
(617) 423-1200

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Aggressive, creative Software Engineers & Software Eng Mgrs req by Central NY electronics mfr. Requires BSSE and knowl of structured languages such as PASCAL or "C" in UNIX environ. Pref exposure to INTEL micro-processors. Great co—several positions. To \$65,000

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Buffalo, NY 14202
(716) 842-0801

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Have primary technical responsibility for a communications network. Investigate new communications technology for efficient utilization. Must have a large scale SNA background. Work with local and remote networks in both voice and data environment. For more information call our employment service. Ask for Job #131. Salary to low \$40's

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(816) 474-4583

HARTFORD

SYSTEMS PROGRAMMERS

Oppty for MVS/XA VM/CMS and DOS/VSE systems programmers. Conn co's offer exciting growth potential, state-of-the-art environ, suburban settings and many perks (relo, bonuses, etc). Min 2-3 yrs exp req'd. Salaries \$35-42,000

DATA BASE

Bkgrd in IMS or IDMS qualifies for growth oppty in lg IBM — OS/MVS/VM shop. Participate in major DB dev proj to define co's direction in future use of relational data bases. Excellent potential for tech competent DP prdr \$35-40,000

SYSTEM DESIGN MGR

Manage leading edge project dealing with latest techniques (data base, data comm, office auto). Evaluate vend hrdw & soft in des of on-line syst to improve prog/sys productivity. Outstanding oppy for indiv with strong tech bkgrd & excellent interpersonal skills. Salaries \$35-41,000

TECHNICAL PROGRAMMERS

Exp with CICS and/or DL1/IDMS qualify for positions on new dev proj. Suburban hi-tech client has major app'n plans for on-line/data base systems. Excellent growth potential and many benefits. Salaries range \$24-36,000

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Exp with MVS/XA systems perf qualifies for position with central Conn client. Indiv will assume lead role for all perf activities—multi-CPU environ with on-line/data base. Full benefits plus annual bonuses. To \$45,000

TELE-COMM

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Sr level internal consultant position for CICS command/micro lev indiv to provide support for new on-line dev projects. Immediate mgmt potential. Salary to \$38,000

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of Wisconsin
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Manufacturer in St. Louis has an immediate need for a 2 yr programmer on Univac 1160 using COBOL and on-line applications. You will work on manufacturing and financial systems. Excellent benefits in a stable organization! Call this week! To \$26,000

VM SYSTEMS PROGRAMMER TO OZARKS

Service firm has a long-term commitment in the Ozarks and immediately needs an S/P with 3+ yrs OS/VS1, VM for a 4341 shop. Very good benefits and excellent career growth pattern! To \$38,000

COBOL P/A

Several positions available for Business Applications programmers using COBOL in DOS/VSE and OS/MVS environments. IMS or IDMS, any PC applications, or financial packages are definite pluses! Golden opportunity! To \$39,000

FORTRAN P/A'S CENTRAL ILLINOIS

Large service organization seeks Fortran programmers to work with engineering departments in problem identification and resolution. You will analyze, guide, design & train engineers. Excellent benefits and relocation package! To \$36,000

EDP AUDIT MANAGER

Service firm is looking for a manager to direct DP Auditing activities. Planning skills and technical background are needed to manage subordinates conducting audit reviews. Great benefits and paid relocation. To \$45,000

Randy Pace or Warner Coffman

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of St. Louis
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St. Louis, MO 63105
(314) 727-1535

NEW YORK

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Two positions exist within this budding area of rapidly expanding EDP training corp. Successful candidate must be able to train corp level staff on CICS Internals either Command or Macro level. Past experience is a definite plus. Strong communication skills req'd 30% travel throughout US. Become an integral part of this fast-paced field. Fee Paid. \$50,000

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TENNESSEE

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Many TN openings for 2+ years COBOL experience in an IBM OS/MVS environment. IMS or CICS background preferred. Openings at all levels! \$50,000

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Opportunity to start up this EDP Audit Function for a large mfg concern. 3+ years in EDP Audit required with excellent technical skills. Low \$30's

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(615) 361-4900

SAN ANTONIO

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Degree preferred, not required. 8+ yrs DP exposure with min of 3 yrs Operations Mgr — 2 yrs 38 exp. Shop is in install phase of major software pkg with DP Mgr position within year. Must be hands-on shirt-sleeve person. Definitely a fast growth position. \$32-37,000

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Degree required, 3+ yrs exp with COBOL, OS, CICS, and all facets of EDP Audit. Company is fast growing and is a 1st person dept. Potential to Sr or Mgr within 18 months. Benefits superb. \$24-28,000

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(504) 835-4296

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We offer a highly competitive salary/benefits package and the opportunity for rapid career advancement through increasingly responsible assignments. To arrange an interview, please send your resume to: Systems Control, Inc., Professional Employment, Dept. CW, 1801 Page Mill Road, CA 94304. An equal opportunity employer m/f/h/v.

SYSTEMS CONTROL, INC.



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Minimum 4 to 5 years data processing experience. Must have a proven track record in design and implementation for an online database environment. Background must include strong command of COBOL and experience with manufacturing systems. Degree desirable, but not required.

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Minimum 3 to 4 years data processing experience. Must have good exposure to design concepts and their application. Extensive COBOL background is a must. Experience with data base techniques and manufacturing systems is a definite plus. Degree desirable, but not required.

PROGRAMMER/ANALYST

Candidate should possess 2 to 3 years heavy COBOL experience developing programs in an online environment. Data base and manufacturing systems exposure are a plus. Degree desirable, but not required.

Company is a well established and growing manufacturer of consumer items, primarily in the clock product lines, and has enjoyed a fine reputation for over 170 years. Please forward a resume and salary history to:

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EEOE

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Programmer/ Analysts

Needed to work on computer system program design and implementation. Requires 2 years of college education and 2 years of experience or equivalent. Forty hour work week on varying time schedules. Salary and benefits to \$35,000. Employer-paid ad. Send resumes to:

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Detroit, Michigan 48202
Reference #21284
EOE-M/F

Data Processing

ANALYST/PROGRAMMER

Due to continued expansion of our computer facilities, Black & Veatch is seeking an individual with 2 years experience in the development of computer-aided graphics design systems with emphasis on interactive graphics. The successful candidate will have a BS or MS in Computer Science or in Engineering with heavy emphasis in computer graphics.

We offer competitive salaries and a complete benefits package. For confidential consideration, send resume with salary history to: C. S. Martens, Black & Veatch Engineers-Architects, Dept. CW7, P.O. Box 8405, Kansas City, Missouri 64114; or call collect at (913) 967-2841.

Black & Veatch
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Contact: Alan Pike

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Contact: Margarete Kolis



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(303) 779-8890

Principal Programmer Analyst

UCLA's Medical Center has an exciting and challenging opening for a Project Manager for Medical Center on-line applications. Position requires working knowledge of IBM PCS based admission/discharge/transfer and order management systems, proven on-line systems development, and demonstrated experience meeting deadlines on large scale applications. UCLA offers a challenging work environment and excellent fringe benefits. Please send resume to: **Michael Doscher, Hospital Computing Services, UCLA Medical Center, HANX 180 - Job #A2295, 10833 Le Conte Ave., Los Angeles, CA 90024.** An affirmative action employer.

UCLA



UNITED AIRLINES

CMS 1100/TELCON SYSTEMS PROGRAMMERS

United Airlines is upgrading its large airline operations network to a distributed nodal system utilizing multiple DCP 40 communications processors. This project has created an immediate need for experienced CMS 1100 and TELCON Systems Programmers. Positions are available in the Chicago area for programmers with 2+ years experience in CMS 1100 and/or TELCON.

United offers pass/reduced fare air travel privileges for employees and their immediate family members. For consideration, send resume including salary history to: Professional Employment/EXOPX-CW2, United Airlines, P.O. Box 66100, Chicago, IL 60666. Equal Opportunity Employer.

POSITION ANNOUNCEMENTS

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ANALYSTS WANTED**

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HOSPITAL INFORMATION SYSTEMS

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- Hospital Information Systems Management
- Clinical/Financial Systems Analysis
- Applications/Systems Programming
- Product Planning/Analysis

Technologies include: MIS/MUMPS, IBM MVS, RPG II/III, Cobol, PCS, DOS, CICS, and JCL. Experience in financial, clinical and/or administrative hospital systems required.

CompuCare offers a highly competitive compensation and benefits package to qualified applicants. Interested applicants should forward their resumes, plus salary history to:

COMPU CARE, INC.

8200 Greensboro Drive
McLean, VA 22102

Attn: Mike Kunc, Technical Recruiter
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A strong, current knowledge of the application software marketplace. Mini and micro software knowledge. Direct and distributor sales channel experience. High level market strategy planning and internal sales management talent. Creativity in product ad campaign and sales performance incentive plan. Experience in sales support/training programs. Sales and product performance analysis ability as they apply to marketing. IBM hardware/software industry familiarity. Software product publishing exposure.

We want a marketing management professional with these attributes! We want a corporate leader to join our growing team! We want to offer and attain greater worldwide success! Come, join a rising name in the software publishing and support industry! Be prepared for the biggest challenge of your career! Send resumes in confidence to: P.O. Box 13648, Milwaukee, WI 53213.

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Garland Division Are Taking Technology
Where It Has Never Been Before... Turning
SCIENCEFICTION into SCIENCEFACT.



E-SYSTEMS

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- Where there is an atmosphere that promotes talent and personal growth
- Where the highest caliber employees enjoy an environment that expands expertise into excellence
- Where every day there are exciting technical challenges to be met and solved

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- Where our unique Relocation Center will help you if joining E-Systems in Dallas means a move
- Where merit increases are tied to refreshingly human performance reviews
- Where career pathing is taken seriously within a quality work environment

The Needs — The Opportunities**Software Specialists****Software Assurance Analysts**

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- Development
- Test and Delivery

Systems and Design Engineers

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- DBMS
- C'I
- Digital Image/Signal Processing
- Compression Algorithms
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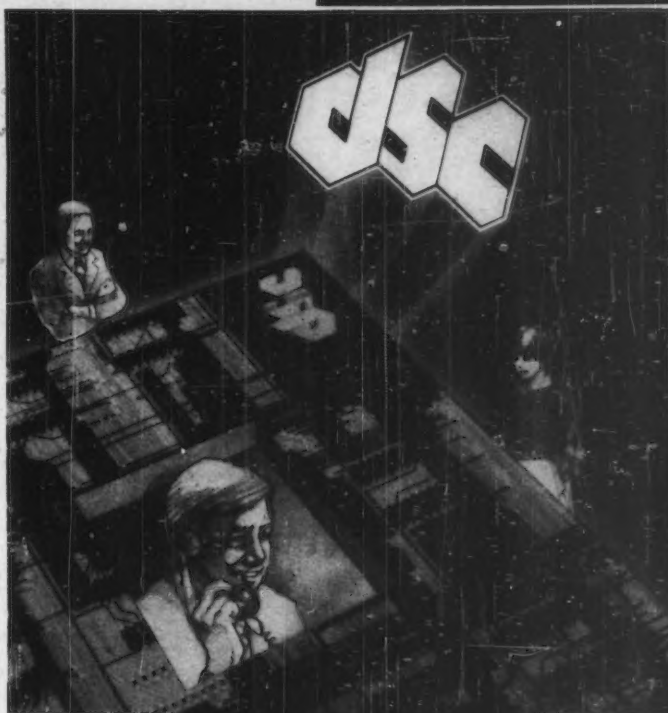
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ADR offers a comprehensive benefits package, liberal relocation assistance and compensation fully commensurate with your experience. For consideration, please forward your resume or call Gary Johnson, (201) 874-9000, APPLIED DATA RESEARCH, INC., Route 206 & Orchard Road, CN-8, Princeton, NJ 08540.



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COMPUTER SYSTEMS, INC. is a dynamic, growing software products and services company located in the desirable Charlotte, N.C. area. Our firm has earned an excellent reputation for its products and services to hundreds of clients since 1967.

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COMPUTER SYSTEMS seeks individuals with a minimum of 1-1½ years data processing experience on either the IBM PC, System 34, System 36 or System 38. We have opportunities for individuals who are proficient in either RPG II, RPG III, COBOL or BASIC and who communicate and work well with clients. In addition, we have a management opportunity for an individual with 3-5 years experience on Basic Four equipment working with Basic Four Business Basic. Familiarity with DOL database and the equipment dealer industry would also be helpful.

COMPUTER SYSTEMS means variety, enormous technical challenge and client responsibility. If you have the talent and desire, we will give you everything you need for a rewarding career. Send resume or call collect.

**Bill Forsyth
Computer Systems, Inc.
100 Dave Lyle Blvd., Suite 101
Rock Hill, SC 29730
803/327-4181**

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Director, Information Services
CENTRE COMPUTER CENTERS
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Individuals should have specified knowledge of MVS and JES 2/3 from a systems and user point of view. Understand the IBM 3800 support software on a systems and applications level for 3800 Mod 1 and Mod 3. Should be skilled in working with the available IBM diagnostic software tools and the IBM 3800/370 I/O interface concept. Experience with IBM operating systems and the related user interfaces totalling a minimum of 5 years. Should have experience with IBM assembler language. System programmer background helpful. Must be willing to travel as job requires.

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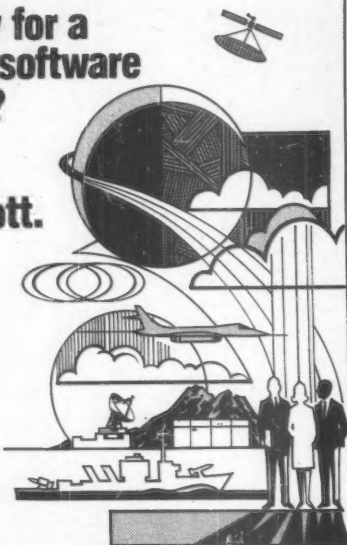
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Teledyne Continental Motors General Products Division, a leading manufacturer and designer of diesel engines and military vehicles, has an immediate opening for an experienced programmer to join our organization.

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Reporting to the Product Manager, this position will be responsible for assisting with market research, product planning and evaluation, forecasting, and developing sales strategies. Additional duties include support with third party companies, customer applications testing, customer pre-sale and trade shows.

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AST Research Inc. offers competitive salaries and benefits with the opportunity to develop your technical marketing skills. Please submit your resume and salary history to: Ann Quackenbush, Human Resources, Dept. CW, AST Research Inc., 2121 Alton Ave., Irvine, CA 92714. Equal Opportunity Employer

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Send resume to the attention of:

**Lisa Sarno
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(Aerospace)

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SYSTEM SCIENCES DIVISION
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Sierra Systems Consultants Inc., an international computer consulting firm, has been providing commercial systems development to a variety of clients for over 16 years.

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In our System 38/RPGIII environment we offer opportunities for serious individuals who enjoy large or small scale systems and who would like to work on a worldwide computer based modular system. You will be supporting all Mattel locations — or accept the ground floor challenge of a small scale distribution package for our new plush toy line. If you have at least 5 years experience in an IBM environment including at least 2 years on a System 38, we'd like to consider you for one of these opportunities:

SENIOR SYSTEMS ANALYSTS SENIOR PROGRAMMER/ANALYSTS

Join the creative team working at Mattel. We'll provide you with a competitive salary and excellent benefits including relocation. And you'll be working in a pleasant environment with friendly and supportive people. Please call COLLECT (213) 978-7274 or send your resume and salary history, indicating position of interest, to: Mona Strehler, 01-131-C09.

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You will establish a project control system, approve project plans for major developments and perform evaluations of projects during performance. Will also develop quality standards, and provide training to data services components. Requires a BS degree and 10 years experience in data processing, 8 of which must be in systems development and project management. Knowl-

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You'll conduct performance measurement on an MVS triplex computer configuration with shared DASD, IMS, VM/CMS and TSO, and also CAD/CAM applications. The ability to report design and implementation for performance tracking is essential. A BS degree in Computer Science or Math and at least 5 years performance/capacity analysis is required.

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Performing on a variety of projects involving software development, systems analysis, and distributed applications, you'll apply your management skills as well as the ability to interface with user management to projects of varying duration and technical depth. Your expertise in either Microcomputers or Advanced Generation Tools is required.

Local Area Network Analyst

You'll work on a small team to interface technology with an IBM network. You must be knowledgeable in MVS and network performance as well as capacity planning, MVS internals and the VTAM interface to SNA Communications network. A BSEE or CS degree and 5 years experience is required.

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You'll develop and maintain software for CDC Cyber computers. Detailed knowledge of CDC operating systems, especially NOS 2 and Assembly language programming is required. A Bachelor's degree and 3 years design and/or maintenance experience is essential.

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Responsibilities will include operating system installation, maintenance, troubleshooting and tuning, program product evaluation and implementation, software development as well as hardware and software configuration analysis. Experience working in an IBM/3083, 3380 environment is a plus for this position.

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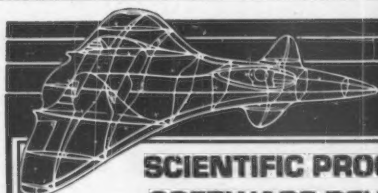
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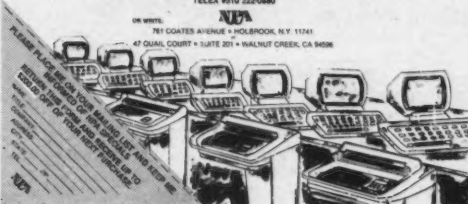
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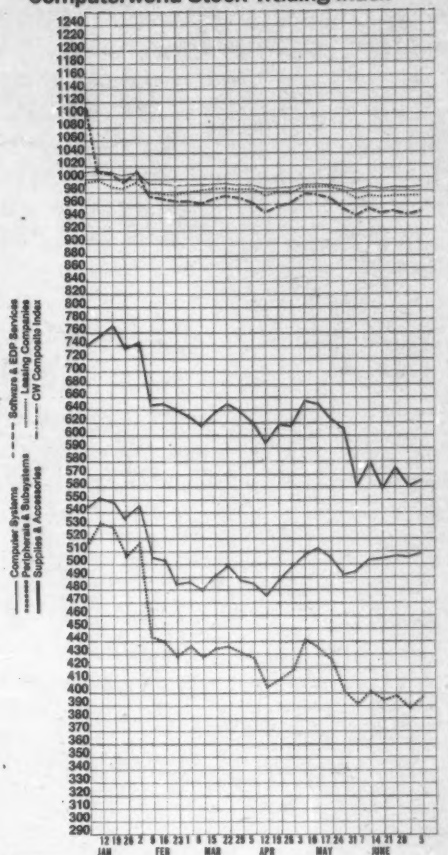
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Computerworld Stock Trading Index



Computerworld Stock Trading Summary

CLOSING PRICES TUESDAY, JULY 3, 1984

All stocks compiled,
computed and formatted
by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

PRICE					PRICE					PRICE					PRICE				
E	K	C	H	N	1983-84	CLOSE	HIGHER	LOWER	WEEK	1983-84	CLOSE	HIGHER	LOWER	WEEK	1983-84	CLOSE	HIGHER	LOWER	WEEK
					RANGE	1984	NET	CHNGE	RANGE	1984	NET	CHNGE	RANGE	1984	NET	CHNGE	RANGE	1984	NET
COMPUTER SYSTEMS																			
D ALPHA MICROSYSTEMS																			
D ALTOX COMPUTER SYST																			
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D COMPUTER CONSOLE																			
D CONTROL DATA CORP																			
D CONVERSATION TECH																			
D CRAY RESEARCH INC																			
D DATA COMMUNICATIONS																			
D DATAPoint CORP																			
D DIGITAL EQUIPMENT																			
D KEO INC																			
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D GENERAL AUTOMATION																			
D GUILD INC																			
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